A STUDY OF THREE-YEAR JUNIOR AND THREE-YEAR SENIOR HIGH SCHOOLS IN THE STATE OF FLORIDA: THE RELATIONSHIP OF SIZE, QUANTITY OF OPPORTUNITY, AND COSTS

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CHAPTER I

INTRODUCTION

Forty years ago less than 2 percent of the Gross National Product was allocated to the support of the public elementary and secondary schools. In 1966-67 approximately 3.6 percent of the Gross National Product was allocated to the support of the public schools. By 1977-78 it is probable that as much as 6 percent of the Gross National Product will be allocated to the public schools (34).

Increased costs of public education require increased taxes. The tax-paying public is becoming more and more sensitive to tax increases. Therefore, officials charged with the organization and management of the public schools are facing increased demands to maximize the production of educational services and at the same time to minimize the unit costs of those services. Total costs of public education will undoubtedly increase. However, increases in the unit costs of increased educational services can be minimized if the most advanced organizational structures and managerial techniques are used.

This study is concerned with only one of the many organizational and managerial policies which should be considered by school officials. The organizational policy examined in this study is the relationship of the size of three-year junior high schools and three-year senior high schools to the quantity of educational services provided and the unit costs of those services. This study is in effect a simple problem in systems analysis. The individual school is conceptualized as a processor. Costs are

considered as in-puts, and educational services as out-puts. What economies of scale can be obtained by regulating the size of the processor? That is, as the size of the school is increased, is the quantity of educational services produced increased, and what effect does increase in size have on the cost per unit of educational services? The problem in this type of systems analysis is to maximize the production of educational services and at the same time to minimize the unit cost of those services. It is a special type of systems analysis in which the unit costs of various sizes of schools are compared with the benefits obtained.

The study is particularly limited to three-year junior high schools and three-year senior high schools in the State of Florida. These types of schools are considered because they are the types of school organizations which prevail in Florida. There are a few four-year senior high schools in Florida and there may be more four-year senior high schools if the middle school type of organization is generally adopted. However, studies of economies of scale of three-year senior high schools are usually quite relevant to size and costs of four-year senior high schools.

The assumption is made in this study also that the school officials have the option of constructing junior high schools and senior high schools of varying sizes. This assumption is sound in densely settled urban and suburban areas because the school population is increasing in those areas and declining in the rural areas. In sparsely settled rural areas boards of education do not have a wide range of options in building high schools of different sizes. However, by means of reorganization of local school districts and the consolidation of unnecessary small high schools, school

officials can move toward the construction of schools of more efficient size, even in rural areas.

It is not the assumption of this study that high school opportunity should not be provided in sparsely settled rural areas because unit costs are exceedingly high. However, it is the assumption of this study that in areas where public school officials have the choice of building high schools of different sizes those officials should build high schools of such size as to maximize the educational services provided and to minimize unit costs.

Certain assumptions relating to equalization of educational opportunity are also made in this study. It is assumed that it is one of the goals of this nation to maximize the development of talents of all pupils regardless of variations in the abilities and interests of the students. In order to make educational opportunities equal it is necessary to provide comprehensive, rich programs in high schools which will provide a wide range of interests and abilities of students. Therefore, in this study a careful examination will be made of the breadth of educational opportunity provided and the size of schools. Do boards of education unnecessarily limit the breadth of educational opportunity in high schools by building smaller high schools in areas where they could readily build larger high schools? If boards of education build high schools in urban areas so small that economies of scale cannot be obtained, do those boards limit the range of educational services provided simply because their inefficient organizational policies make it impossible to provide those services at a reasonable unit cost? In other words, are inefficient organizational policies for high schools unnecessarily reducing the

possibilities of equalizing educational opportunities for students with varying abilities and interests?

The size, cost, and amount of educational opportunity in three-year junior high schools and three-year senior high schools in the State of Florida were examined in this study in an attempt to determine what size school offers the greatest amount of educational opportunity at the lowest possible cost.

The Problem

The increasing cost of education has become a national concern. School officials are under constant pressure to minimize expenditures and maximize educational services. To meet this goal school size has become a major problem. Is there a "best" size school? The basic purpose of the study is to analyze this question. Wright (56) expressed the problem in her statement:

> Is there one most desirable size for high schools? This is a question most frequently asked by both laymen and educators who are faced with the necessity of enlarging a school building or establishing a second school elsewhere. . . . Seemingly, in spite of the constant inquiry relatively few attempts are made to provide answers to this question.

The data gathered concern size, cost, and programs offered in Florida's three-year junior high schools and three-year senior high schools. Certain relationships will be analyzed. These are:

1. The relationship between <u>school size</u> and <u>quantity of educational opportunity</u>.

2. The relationship between <u>school size</u> and <u>cost per student for</u>

instruction and transportation.

3. The relationship between school size and cost per student per unit of educational opportunity.

Conclusions regarding a "best" size school will primarily be made on the basis of these relationships.

No study of the type proposed herein has been made of three-year junior and three-year senior high schools in the State of Florida during recent years. The last critical analysis made in Florida relative to secondary school size was a study by Woodham (54) in 1951. This study was concerned with six-year high schools, three-year high schools, four-year high schools, and Negro secondary schools. An analysis of Table 1 shows the three-three organization as the emerging pattern of secondary schools in Florida. Therefore it is important that schools of this organization be studied in relation to their contribution to an adequate and economical educational program.

The Background and Delimitations of the Study

The schools involved were 177 three-year junior high schools and 91 three-year senior high schools located in the State of Florida. Florida has only county administrative units and has only 67 such units. Florida has a state Minimum Foundation Program applied equally to all counties. Counties supplement the Minimum Foundation Program from local tax sources. Legally, property assessments are supposedly uniform at 100 percent of property values. However, this is not true in many cases; but it is anticipated that this goal will be substantially accomplished by the 1967-68 school year. Accreditation standards for Florida schools are based upon

TABLE 1

FLORIDA PUBLIC SECONDARY SCHOOL ORGANIZATION 1950-1964

Year	Three-Year Junior High Schools	Three-Year Senior High Schools	Junior-Senior High Schools	Four-Year High Schools
1949-50	28	23	42	0
1950-51	31	24	43	9
1951-52	33	26	42	11
1952-53	46	31	34	17
1953-54	47	30	31	20
1954-55	51	37	36	20
1955-56	63	35	36	26
1956-57	69	36	36	25
1957-58	84	45	37	28
1958-59	101	49	61	28
1959-60	114	57	70	28
1960-61	143	63	86	34
1961-62	149	74	89	31
1962-63	169	87	94	29
1963-64	194	90	93	31

Source: Division of Research, State Department of Education, Tallahassee, Florida (excludes other grade combinations).

programs and practices developed with respect to the organizational pattern of the schools--elementary, junior high, and senior high. However, they are applied uniformly to all schools regardless of size.

Florida, as indicated by school enrollment, is one of the fastest growing states in the Union (see Tables 2 and 3). Currently Florida is experiencing all the problems of a shifting and mobile population and is having to cope with most of the contemporary sociological, economic, and political changes. Since Florida contains rural, urban, and suburban areas, school plants are in constant need of being built, remodeled, or phased out. Florida requires a school plant survey for assisting counties in planning and developing school plants. However, the size of schools above the minimum standards required by the state is determined by local school boards.

The findings of this study should be regarded in the light of certain delimitations. Some delimitations of major importance were:

1. Only three-year junior and three-year senior high schools were included.

2. The schools in the study were all located in one state.

3. Sizes of schools in Florida were not "extremely" large as they might have been in the more metropolitan systems.

4. The quantity of opportunity measure involved only the formal program of study and those professional services available to students at the local school level.

5. The cost factors in the study involved those costs for instructional personnel and transportation of students. Salary averages state-

TABLE I

FLORIDA PUBLIC JUNIOR HIGH SCHOOL ENROLLMENT BY GRADES 1950-1964

Year	Grade 7	Grade 8	Grade 9
1949-50	40,717	36,457	32,215
1950-51	44,075	38,469	32,613
1951-52	46,945	41,820	35,599
1952-53	49,531	44,646	40,119
1953-54	53,154	47,432	42,326
1954-55	59,747	51,322	45,959
1955-56	66,131	58,306	49,792
1956-57	70,814	65,820	58,070
1957-58	74,242	59,807	64,908
1958-59	85,416	71,953	67,361
1959-60	95,364	82,032	68,552
1960-61	98,467	92,779	79,714
1961-62	101,213	95,038	91,016
1962-63	102,892	97,410	93,319
1963-64	108,461	98,666	94,243

Source: Division of Research, State Department of Education, Tallahassee, Florida.

TABLE 3

FLORIDA PUBLIC SENIOR HIGH SCHOOL ENROLLMENT BY GRADES AND GRADUATES
1950-1964

Year	Grade 10	Grade 11	Grade 12	Graduates
1949-50	28,618	22,411	18,908	16,485
1950-51	30,563	23,976	19,267	16,504
1951-52	32,169	25,615	20,118	17,888
1952-53	34,164	27,633	21,915	19,007
1953-54	37,439	29,058	23,291	20,638
1954-55	40,628	32,538	25,417	22,106
1955-56	43,934	34,938	27,927	24,637
1956-57	48,278	38,662	30,118	26,319
1957-58	55,473	42,581	32,891	26,319
1958-59	61,561	48,905	36,408	32,051
1959-60	63,449	54,151	42,487	37,296
1960-61	65,395	55,915	48,097	41,682
1961-62	76,509	57,881	48,742	42,882
1962-63	87,629	69,111	50,992	44,168
1963-64	89,539	79,236	60,719	53,783

Source: Division of Research, State Department of Education, Tallahassee, Florida.

wide were used when available. Approximate salaries were used when salary information was not available.

6. This study dealt in quantity and no attempt was made to study the quality of services rendered.

7. Only quantity of educational services and cost per unit of educational opportunity are used as determinants of minimum and optimum school size.

Sources and Treatment of Data

The primary source of data used in this study was the accreditation reports filed by principals annually with the State Department of Education. The number of students transported was obtained from the transportation section of the Florida State Department of Education. The approximate cost for personnel and transportation was furnished by the Florida State Department of Education and the Florida Education Association. Other data used in the chapter on review of related research came from research papers, doctoral dissertations, opinions as stated in books, and articles written by recognized authorities and practitioners in the field.

The basic data used were:

1. The type organization of the school
2. The student enrollment
3. The total number of teachers and professional educational service personnel in each school
4. The total number of different subjects offered in the program of studies and the time allocated to such subjects

5. The ratio of: teachers to professional educational service personnel; students to professional educational service personnel; and students to teachers

6. Student transportation costs

Transportation costs were calculated and added to the costs for all instructional personnel to determine measurable costs in each school.

7. Salaries for teachers and professional educational service personnel

Costs for instructional salaries were determined by using averages for the State of Florida reported by the Florida State Department of Education and the Florida Education Association Department of Research. The average salary for the entire state was used to determine the instructional costs for each school regardless of the county in which it was located. This procedure was followed in order to eliminate the effect of different salary policies in different school districts and the cost of different sizes of schools. That is, for the purposes of this study, the entire State of Florida was conceptualized as one school district paying the same salary schedule to all teachers. It was also assumed that all teachers had the same training and experience. Costs were then determined in size of school and program offerings. The cost of instructional salaries was the basis for determining the per student cost and the quantity of educational opportunity cost. Costs for instructional salaries plus transportation were calculated in order to determine if transportation costs were a significant factor in school size.

Only costs of instruction and transportation were considered in determining unit costs in individual schools. The cost for these two functions totals more than 80 percent of the current expenditures of the public schools in the State of Florida. Practically all the other costs would have to be allocated to individual schools on a formula basis. Such allocation would assign the same costs per student or per teacher to each school. If the formula used allocated other costs on a per student or per teacher basis it would simply add a constant to each unit cost figure differentiated in this study and would not affect the different costs of different sizes of schools. If other costs were allocated on the basis of the number of teachers, the difference in unit costs of different size schools developed in the study would be increased; therefore the use of costs for instruction and transportation in determining unit costs was a conservative approach. Transportation costs were included simply because it seemed desirable to investigate whether or not the increase in the size of the three-year junior and three-year senior high schools was causing a substantial increase in transportation costs.

8. The quantity of educational opportunity for each school

This was determined by adding the total number of different subject offerings and the amount of different professional educational services available in each school.

9. Per student cost

Per student cost was determined by dividing the reported membership into the sum of the cost of instructional salaries and the cost of transportation in each school.

10. Cost per student per unit of educational opportunity for each given school

This was determined by dividing the per student cost for instructional salaries and transportation by the total units of educational opportunity available to students.

A completed data form for both a three-year junior high school and a three-year senior high school appears in Appendix B.

Certain important definitions are used in the treatment of data. They are:

1. Three-year junior high school--Florida public schools comprising grades seven, eight, and nine operating as a separate school, administratively independent of other grades.

2. Three-year senior high school--Florida public schools comprising grades ten, eleven, and twelve operating as a separate school, administratively independent of other grades.

3. Size of schools--the student membership of the school at the time of the accreditation report, not to be confused with school plant capacity.

4. Professional educational service personnel--those persons employed in a school as professional educators who do not teach students for at least half of the time, in case of less than full-time services, or not at all, in the case of full-time services.

5. Teachers--those professional personnel who teach students either half time, in case of less than full-time teaching, or full time, in case of full-time teaching.

6. Transported students--those students who are transported to a given school who live two or more miles from the school.

7. Unit of opportunity--a numerical measure given to each different subject offered according to type and time and/or the amount of professional educational services according to type and time. This unit is not synonymous with a unit of credit.

8. Quantity of opportunity--the total number of different subjects offered plus the total amount of educational services offered in a given school.

9. Formal program of studies--those different subjects offered in the school to students.

10. Allocated costs--refers to the major portion of current operating costs which in this study are salaries of non-teaching professional personnel, salaries of teachers, and transportation costs allocated to a particular school.

11. Cost per student--item ten divided by the membership of that school.

12. Cost per student per unit of opportunity--item eleven for a given school divided by the total units of opportunity available in that school.

13. Opportunity--used in this study to mean educational opportunity for in-school curricula and related professional educational services. Any other opportunities which a school might offer to students is not included in this study.

CHAPTER II

REVIEW OF RELATED RESEARCH

Research regarding the optimum school size for junior and senior high schools is limited and inconclusive. Variables and abstractions tend to make the researcher of school size cautious of making specific conclusions and recommendations. Most educators have opinions regarding size, but instruments of measurement for validating these opinions are not readily available. In many cases, even when some of the same instruments are used, the results and recommendations vary. A review of related literature reveals the need for more refined research studies. According to Wright (56) from 1956 to 1963 eighteen studies were made on school size. The results of these offered widely differing recommendations. Of these studies only two were based on the three-year junior high school and two on the three-year senior high school. The remaining studies dealt with grade seven through grade twelve, grade nine through twelve, or with just "secondary" without reference to specific organization.

An early study of school size was made by Jesse Woodham (54). In 1951 he examined the secondary schools in the State of Florida with reference to the six-year high school and the four-year high school. Some of Woodham's instruments and techniques, with appropriate modifications, were used in this study (Appendix C). In his study Woodham analyzed the relationship of the size, cost, and breadth of opportunity. As a result he suggested that the minimum size of the three-year or four-year high

school be not less than 500 students. Woodham declined to give a recommended maximum. He did state that a six-year high school should not be decentralized unless it exceeds 1200 in pupil enrollment.

Since Woodham's major concern in the study was to investigate whether or not small inefficient schools should be consolidated, he had no data available to suggest an optimum size. In 1951 Bollea (8) found a relationship between size and achievement. He suggested that a six-year high school with a minimum of 1000 students would have a higher proportion of seniors making high test scores than seniors from smaller schools.

The Junior High School

The three-year junior high school has been, to a great extent, accepted in American education. However, the development of such schools has been based more on population growth and finances than on philosophy. Recently Florida has eliminated the practice of requiring Carnegie unit credit in the ninth grade. The number of required Carnegie units for graduation has been reduced from twenty to fifteen. These units are all earned in grades ten, eleven, and twelve. In many states the earning of credits toward graduation in the ninth grade is still required. This indicates that a four-year high school might be the best organization for credit-earning purposes. Even when the ninth grade was located in a separate junior high school, the separate junior high school was operated like a senior high school since ninth grade credit had to be earned on the same basis as the senior high school. Therefore, only in the last two or three years could the junior high school in Florida actually

operate as a separate school in curriculum as well as administration.

This past practice (and present practice in some schools in Florida as well as other states) very likely has affected the size of the junior high school. There is no doubt that it has affected the quantity of educational opportunity because of the rather rigid requirement that a Carnegie unit be earned. Earning a Carnegie unit was based upon the successful completion of a particular discipline requiring 50 to 55 minutes per period, per day, per year. An additional limitation in many schools was that at least a B or C average be maintained before a student could take more than five subject offerings. Many educators are still not convinced that the three-year junior high school should be a separate school. For example, Conant stated:

> . . . While I can find no overriding consideration to settle a controversy between the three-year school and a four-year high school, I did hear arguments in favor of an organization that provides an eighth grade of at least 125 to 150 pupils--an enrollment one usually does not find in the eight-year elementary. (17:81)

One would conclude from such a statement that the size of the grade membership and not the organization of the school is the major concern in terms of program efficiency. Later in the same article Conant stated, "At least one member of my staff recommends that in the separate junior high school the eighth grade enrollment should contain as many as 250 pupils if efficient use is to be made of the plant . . ." (17:81).

However, Van Til, Vars, and Lounsbury (52) advocate a separate junior high school for program purposes.

If these opinions of Conant were applied to a three-year junior high school, the minimum enrollment would be 375. A more desired minimum

for school plant efficiency would be 750. In terms of other opinions on school plant efficiency, Harrick (29) and others suggest 600 to 800 as optimum. MacConnell (38) gives a minimum of 600 and a maximum of 900 students. The Southern Association (13) suggests that the enrollment should not be less than 120 students per grade for a good junior high school program. They also suggest that the desired maximum enrollment should be 240 students per grade or a 360 student minimum and a 720 student maximum for three-year junior high schools. Cramer, writing in 1955, stated: "The size of the junior high school should seldom, if ever, exceed 900 enrollment" (20:325). In 1956 Cramer stated: "But the trend today is for these independent acting youngsters in grades seven, eight and nine to be housed in separate junior high school buildings with the following facilities: a maximum enrollment of 1000 . . ." (19:426).

In 1960 Conant (17) stated that most junior and senior high schools had enrollments between 300 and 749 and only about 3 percent of the junior high schools had enrollments of 1500 or more. Jordan, writing in 1958, stated: "It is interesting to note that over half of Florida's junior high schools have enrollments of less than 400 students. . . . The separate junior high school deviates farthest from the central tendency by having fifty-four percent with enrollments of more than 900 and an average of 992 students" (35:71). An Association for Supervision and Curriculum Development publication in 1961 stated: "The junior high school of today should be of moderate size. A junior high school of between 500 and 800 students is about as large as is commensurate with a sound program and security for the individual student" (4).

However, not all who write agree with the maximums urged by the already mentioned sources. Tompkins stated:

> Junior high schools are primarily urban schools and in most cases are large schools. The enrollment of the median schools, of the 1225 schools reported, was 625. The average enrollment was 675.4. Almost 71 percent of the responding schools have enrollments of over 500 and 27.6 percent have 1000 or more pupils. Ten of the largest junior high schools reported enrollments ranging from 2242 to 3050. (50:178)

Marsh states: "It used to be that 900 pupils was the recommended size for a large junior high school. Today Los Angeles City is trying to hold its junior high schools to 1600, but junior high schools today are running from 1500 to as high as 2900" (39:101). Raitz wrote:

> On January 31, 1955 we moved into the East Meadow High school building which accommodates 1500 pupils. . . . In September 1955 we opened the 1200 pupil Meadowbrook Junior High School and finally on December 15, 1955 we opened the Woodland Junior High School with a capacity of 1600 pupils. We feel that we have an ideal junior high program. (43:107)

Lounsbury and Douglass(37) in their publication on Recent Trends in Junior High School Practices reported that the average size of the junior high school reporting in 1954 was 598, while the average reporting in 1964 was 702. Their study included 227 junior high schools in 39 states and the District of Columbia. They give a nationwide trend on the increasing size of junior high schools.

Only two basic research papers on junior high schools can be reported at this time. One of the two studies was made in Alabama by Crocker (21) in 1960. He was concerned with teacher preparation and variety of subjects offered in the junior high schools. School size ranged from 100 to 750 or more. His study included seventh and eighth

grade junior high schools; seventh, eighth, and ninth grade junior high schools, and also those which were part of a seven through twelve school organization. He found that the three-year junior high schools offered a greater variety of courses. Next in variety of courses were two-year junior high schools. The junior high school, which was a part of a seventh through twelfth grade organization, offered the least variety of courses. He also found that in most cases teachers were better prepared in the larger school. He concluded that junior high schools should be 500 or more and preferably should comprise grades seven, eight, and nine.

The other study on the junior high school was made in the State of California in 1961 by Garcia (25). His study included 20 junior high schools with sizes ranging from below 750 to above 1800. In this study he was interested in finding an optimal size junior high school. Curriculum offerings, student activities, staff qualifications, and teacher-student relationships were major considerations. He found a direct relationship between school size and curriculum offering. Schools with an enrollment of less than 1000 found it difficult to provide a rich curriculum. He also found that the ratio of student to school personnel tends to favor the school of less than 1400 enrollment. Schools with the most experienced teachers and teachers with the fewest daily preparations were schools ranging in enrollment from 1000 to 1399. Principals participating in this study favored junior high schools with 1000 students with some support for 1400 to 1799 students, but schools with less than 750 or more than 1800 students were not generally found favorable. In recommending an optimal size for three-year junior high schools, Garcia recommended 1000 to 1400 enrollment with 1200 as the single optimum size.

In summarizing the related research on junior high schools, there was some doubt as to what grades should be encompassed in the junior high school organization. There was considerable doubt as to how large the enrollment should be. However, there was general agreement as to minimum enrollments. A minimum enrollment appeared to be in the neighborhood of 125 pupils for programs and 250 for school plant efficiency. Little or nothing was said about administrative efficiency or student education in the form of services of educational specialists other than subject matter availability with respect to minimums or maximums. With respect to subject matter programs, there was considerable doubt as to offerings in length of time, number, and in scope and sequence relative to what the junior high school student should have available as a total curriculum.

The Senior High School

More research studies are available relative to size and educational effectiveness for the three-year, four-year, and six-year high school than for the junior high school. While this study is concerned only with the three-year high school, it will be necessary to examine existing research related to different school organizations that have graduating classes. A major concern in the senior high school centers around effectiveness relative to preparing students for post-high school formal education rather than effectiveness in terms of an organized school in its own right.

Conant (14) considers that a high school should have 100 students in the graduating class as a minimum for an effective size high school. For a three-year organization this implies a total minimum enrollment of

300. The National Commission on School District Reorganization (45) suggests a minimum size of a high school as 300. The Committee for Economic Development, Research and Policy Committee states, "A senior high school with a graduating class of less than 100 is too small to offer a sufficiently diversified curriculum to meet the needs of its students" (44:60). It is almost impossible, for example, to offer advanced science and mathematics courses, the fourth year in foreign languages under teachers qualified in these subjects, along with vocational courses appropriate for other students unless the enrollment is larger. In a ten through twelve grade senior high school this would imply a total enrollment of more than 300 students. In a four-year senior high school well over 400 students, and in a combined junior-senior high school considerably more than 600 students.

The Thirty-Sixth Yearbook of the American Association of School Administrators (3) lists seven disadvantages of a high school with enrollment of less than 300 students relative to program, costs, and efficiency. Beck (6) reported that, in terms of enrollment, a satisfactory secondary school district should have 500 students and questioned the desirability of any secondary district of less than 300. Butterworth (10)states that high schools with less than 500 enrollment are now considered small schools. Gaumnitz (26), writing in 1959 on the Rural School Survey, indicated that the average size of secondary rural high schools was 177.2 students while the county unit system in the Southeast was 200 students. In Florida the average size rural high school was 230.9 students. Gaumnitz indicated that the enrollment was increasing even in the rural schools and posed

the question, "Will the larger school districts and schools do as good a job in the future as the small ones did in the past?" (26:20). Ford (24), writing on the small isolated schools, stated that any high school with less than 200 students is quite small and is in need of assistance.

This quote is from the National Education Association Research Bulletin of May, 1962, "In 1961 small high schools (300 and under) enrolled about 1,500,000 students. Yet, 10 percent offer no chemistry, 20 percent no physics, 40 percent no trigonometry and 29 percent no foreign languages" (49:56). This same publication indicated that small schools lack students, teachers, and financing; only one-fourth of the small schools was accredited by a regional accrediting association. Bohrson, describing the limitations of the small high school, stated that "Our critics say the small high schools are not geared for the space age; that teacher shortages exist in, and are somewhat because of, the small high schools; that audio-visual equipment is limited; that programs are inadequate" (7:106). Cawelti reported that:

> Only 19 percent of pupils in the upper 15 percent ability groups in high schools with under 200 pupils had completed a program with high academic content and that of all of our 1958 graduates (all high schools) 57 percent had no credit in music, 50 percent no credit in foreign languages, and 77 percent no credit in art. (In high schools under 200, 97 percent had no credit in art.) (11:132)

The University of Kentucky reported in the Journal of Educational Research (1) that larger schools appear to produce higher achievement levels among students but was cautious to state that the largest school in the study was only 836 students and that this may be small by other standards. Connelly stated that, "At least in one state, any high school

of over 600 is considered a large high school. I might designate this size of school as minimal' (18:139).

Marsh wrote about secondary schools in England:

> We have found, however, that a small secondary modern school cannot provide the variety of courses and training necessary to develop the varied interests and aptitudes of the pupils. Our better secondary modern schools have, therefore, a school roll of some 750 - 1000 children. In country areas this can mean quite a long journey to school if this size school is provided, but under our system free travel is provided for pupils who live more than three miles from school. (40:81)

Bereday and Lauwerys stated, "If we say that a school is too big or too small we are implying that it is too big or too small for certain quite definite tasks which we expect the school to discharge at any given time for the particular society which it serves" (46:339) They further reported that sizes of high schools in America may range from 100 in the Midwest to 5,000 in New York and that as the size of a school increases, more programs can be offered.

A significant trend toward larger high schools was reported in an article in the Nation's Schools, February, 1965:

> A common characteristic is shared by the 116 elementary and 164 high schools in the architectural exhibit planned for this month's convention of the American Association of School Administrators. Most of the schools are big. A majority of the elementary plants have capacities for 600 to 1000 pupils. Junior highs are larger still and senior highs for more than 2000 are not unusual. (42:22)

Gores wrote:

> With America's population doubling in the next 40 years or so, schools will have to get larger. It is clear now that a high school can be as large as it has to be and still be a good school provided countervailing measures are taken to decentralize its administration. The growth

> of house plans and schools-within-schools has come naturally as schools have had to exceed the maximums of size appropriate to simpler times. Evanston Township High School (Illinois), for example, expects to go to 6000 students and expects also to continue to be a good school. And Boston is planning right now for a high school of 5500 ultimately. But the real test of administrative imagination will come when some of our urban districts experiment with education parks or plazas enrolling 10000 pupils or more. If these huge schools maintain the monolithic administrative structure substantially unchanged from Horace Mann's recommendations after his inspection of the Prussian school system,it is predictable now that these schools won't work. It is pleasant to note that both in Pittsburgh and East Orange, New Jersey, where education parks are being planned, both the administrative structure and the buildings themselves will provide for houses or sub-schools within the total complex. (27:70)

In addition to the various articles referred to on school size and effectiveness, there are the research papers which have been prepared over the past few years. These papers have been treated chronologically as they were studied and reported.

In 1956, Brown (9) made a study of fourteen four-year high schools in Southern California, ranging in size from 446 to 3814 students. He attempted to determine the relationship between educational factors such as: extent of curriculum offerings, ratio of administrative, supervisory, special services, pupil participation in co-curricular activities, and current expense costs of education. In the area of curriculum, he found that the larger schools have a larger variety of courses. Schools of 1500 to 1800 in size were able to provide a choice of course offerings. In the area of extra-class activities, he found a substantial correlation between size and percentage of students participating in co-curricular activities. A recommendation for school size in this area was from 1500 to 1700 students.

Secondary school administrators and college professors supported an enrollment of approximately 912 and 1121 students respectively. These values were averages of school size submitted by particular administrators. Brown qualified these averages in the study of school size with respect to the size school of each administrator. He concluded that the experts recommended 1500 as the most desirable size. The current expense cost in his study showed little correlation with size. Brown's conclusion after considering all the factors involved in the study was that the best compromise was an enrollment of 1500 to 1700 for the high school.

In 1958, Thomas E. Woods (55) made a study to determine the effect of a school's size upon the school's program. In this study, Woods administered four questionnaires to a random sampling of different populations within seventeen four-year schools in the Bay area of California. Enrollment ranged from 800 to above 2000 students. Sampling included all administrative officials, 50 percent of the teachers, 10 percent of the students, and 10 percent of the parents. He found that there was no consistent relationship between the size of schools and the following: availability of curriculum, parental participation in the student activity program, and student reaction to the activity program. He found, however, the most favorable parental reaction in schools with from 1200 to 1599 students. His study suggests that size may be a limiting factor for schools in the 800 to 1199 range with respect to matters of instruction, parent and pupil awareness of curriculum offerings, organization and administration of the activity program, and curriculum development.

He cautioned that, within the limitations of the study, arguments that the larger schools tend to lose sight of the individual needs of youth does not appear to be valid. Implication for size in the study was that of from 1200 to 1599.

Also in 1957, James Carroll Tyson (51) made a study of the relationship of school size and pupil-teacher relationships. In this study he sought the reactions of 1255 pupils and 135 teachers in 28 white rural twelve-year high schools in Virginia. Enrollment ranged from less than 50 to more than 1400 students. The results of this study were not consistent in showing a difference in teacher-student relationship in schools where the enrollment was below 273 or above 490 students. The difference in relationship seems to favor schools with enrollment from 273 to 490 students.

In 1958, Lloyd Nelson Andrews (2) made a study of the relationship of high school size to school-community relationships. The four areas of community relationship were: (a) understanding of the program and purpose of the school, (b) extent of individualized attention and close personal relationships, (c) participation in school affairs, and (d) evaluation of the school program and purposes. Andrews administered four questions to a random sampling of different populations within seventeen four-year schools ranging in enrollment from 800 to more than 2000 students. This study was in the Bay area of California. Included in his sample were: administrative personnel, 50 <u>percent</u> of the teachers, 10 <u>percent</u> of the parents, and 10 <u>percent</u> of the students. He found that smaller schools had better parent relationships and more parent participation. However,

larger schools offered a more comprehensive program and did as well as the small high school in providing student participation in school affairs. Andrews recommended that the optimum size school, in terms of community relationship, should have an enrollment of 1200 to 1599 students.

In 1958, a study was made by David Franklin Shapiro (47) in an effort to discover the effect of school size upon staff relationships. He administered four questionnaires to a random sampling of different populations within seventeen four-year schools in the Bay area of California. Enrollment was from 800 to above 2000 students. The sample included all administrative personnel, 50 percent of the teachers, 10 percent of the parents, and 10 percent of the students. He found that more effective communication, more group cooperation, and more staff performance were associated with the smaller school. There was little difference in the active staff participation in the administration of the various size schools. Also there was little difference in the total hours spent on the job by the staffs of various size high schools. However, the kinds of activities assigned to members of the smaller schools were more meaningful to them than those assigned to larger high schools. Supervision was found to be more effective in schools ranging from 1200 to 1600 enrollment. Even though he found that conditions favoring staff relations in one size of high school over another were not great enough to warrant major sacrifices in seeking a specific size, he recommended that schools ranging from 1200 to 1600 in size were the optimum for staff relationships.

In 1959, John Menonzi (41) made a study to try to determine the optimum size of high schools, grades nine through twelve or ten through twelve. Twelve high schools with enrollments ranging from 750 to 3500 students were involved. These schools were members of the North Central Association of Colleges and Secondary Schools. Three questionnaires were administered to pupils, teachers, and administrators. The questionnaires were concerned with eight items: the curriculum, guidance services, extracurricular program, functional and effective use of the school plant, equipment and grounds for curricular and extracurricular program, community use of school plant, equipment and grounds, effective organization of student programs, student morale and faculty morale. Four of the eight items studied revealed differences with regard to size. According to student opinion, the 750 to 1437 size of schools appeared to serve students in more areas of guidance than did larger schools. Student replies also revealed that in schools with a 2125 to 3500 enrollment, students belonged to more organizations. Likewise, teachers indicated that their participation in school-community organizations increased with the size of the school. However, teachers' responses indicated that the number of "fair" ratings for students increased with the size of the school. In the area of teacher morale, it appeared that the morale of the teachers was higher in several respects in schools when the enrollment was 2125 or less. Menonzi concluded that the study did not reveal an optimum size for high schools.

In 1959, Donald F. Hoyt (30) did a study to learn what differences existed among the college grades of students from different size high

schools. His study was limited to 598 men and 286 women in their freshman year at Kansas State College, 1956. These freshmen were grouped in high school graduation classes of 25 or less, 26 to 49, 50 to 99, 100 to 250, and 251 or more. Items used in the study were: the high school rank, the measure of potential for college work (the American College Testing), and the grade point average for the first year's college work. The findings of the study revealed that: in terms of the potential for college work, as measured by the American College Testing, differences among students from various size high schools were not statistically significant. First year grades were about the same for students from various size high schools. High school rank correlated with grades to about the same degree for students from the various size high schools, and grades tended to be over-predicted for students from small schools. The study concludes that the present research is inconsistent with some of the earlier research. The research study suggests the possibility of significant institutional differences, but gives no indication of a suggested size high school.

In 1960, Clifford Smith (48) made a study to determine an optimum size for schools in the State of Ohio. He attempted to determine the relationship of any secondary school size to cost; the relationship, if any, of secondary schools to certain program effectiveness factors; the effect of community characteristics on the size factor relationship; and an optimal school size range for three- and four-year secondary schools in Ohio. Basic data for the study were provided from the State Department of Education on reports made by the school administrators and from question-

naires to the high school principals of each of the 404 reporting schools. Three hundred ninety-two, or 89 percent of the participants returned questionnaires. The conclusions reached in the study indicated that, when all the factors were considered, the 800 to 1200 size of schools was the range at which the favorable factors reached the maximum and the unfavorable factors approached the minimum. Costs were in schools under 400 and advantages diminished when schools' enrollments exceeded 1200. A final conclusion is that, in the State of Ohio, the optimal size range for three- and four-year high schools is from 800 to 1200.

In 1961, Charles H. Weaver (53) studied the influence of size on the quality of education in a state where 72 percent of the high schools have fewer than 300 students. Questionnaires were sent to high schools according to size and geographic location. Enrollments ranged from 100 or less to more than 750. A survey was made of 100 college students at the University of North Carolina who had been freshmen in 1956. Students were chosen on the basis of the size of the school attended and geographic location. Findings of the study revealed that dropout percentages were greater in small schools than in larger ones. Large high schools had a greater percentage of teachers with graduate training than the small schools--38.3 percent as compared to 9 percent. Large high schools had a more extensive guidance program, more instructional aids, special classrooms, and special teachers. On the average, students from small high schools did not achieve as well as those from large high schools, earning fewer credits and quality points. A larger percentage failed to earn passing grades, indicating that programs in the large schools seemed to

be superior to those of the small schools. There was evidence of the preference for large high schools. There was no recommendation as to the best size of high school.

In 1961 Ralph D. Jantze (32) made a study, "An Analysis of the Relationship of Accreditation, Finance and Size of Nebraska High Schools to Scholastic Achievement." In the study of the 46 secondary schools, Jantze found statistically significant differences in scholastic achievement as determined by the Iowa Test of Educational Development for schools according to size. Achievement increased as enrollment increased to somewhere between an enrollment of 400 to 799, then decreased as indicated by the mean achievement scores for the five groups of school size used, which were: under 100, 100 to 199, 200 to 399, 400 to 799, and 800 or above.

Another study in 1961 by B. Jack Collingsworth (12) examined the relationship of size of Arkansas high schools to qualifications of teaching personnel. Collingsworth classified schools studied as 150 or less, 200 to 350, 400 to 500, 600 to 750, and 800 or more. His study concluded that: (a) as the size of the school increased, the relative number of emergency teachers decreased, (b) the relative number of teachers with advanced degrees increased with the size of the school, and (c) the percentage of teachers instructing outside of their field of preparation decreased as the size of school increased.

While no attempt was made to indicate a preferred size for schools, inferences indicated that larger schools are more competent in utilizing staff efficiently, with respect to staff qualifications.

In 1961, Lindsey R. Harmon (28) conducted a study into the relationship of high school backgrounds of science doctorates, based upon

class size and ability in Ph.D. production. In this study, Harmon found that the fields of physical science and social studies were most sensitive to class size,with biological science less strongly affected. Art and humanities classes were not particularly sensitive to size. In education, the relationship is almost non-existant. He discovered that when productivity of the candidates was studied, the largest size of class (800 and above) resulted in productivity three times the national norm. For graduates in classes under 100, the productivity was below the national norm, while those in graduating classes of more than 100 were above the national norm. General indications here tend to support the larger school (2000+) when productivity in science doctorates is measured.

In 1962, Robert G. Barker (5) and others studied the effect of high school size upon the behavior and experiences of students in eastern Kansas. Their study was limited to the non-class behavior setting of students.

The records of the Kansas State High School activities were studied for individual participation from each of 218 schools, ranging from eighteen to 2287 enrollment. Senior yearbooks were studied from 36 schools, ranging in enrollment from 34 to 2287 students. One large school with an enrollment of 2287 and four small schools with enrollments ranging from 83 to 151 were investigated. Among the major findings and conclusions was the indication that not only do students in smaller schools engage in more activity but they achieve more satisfaction than those in large high schools. The only advantage shown by the large high school was the larger scope of activities.

In 1962, John C. Flanagan (22), in Project Talent, reported in his

major findings and conclusions that a low positive correlation was found between school size and achievement on various standardized tests. He also stated that there seemed to be no evidence that size is necessarily related to the excellence in student outcome. The study does suggest that the larger school size is a proper and important objective for providing a greater variety and depth of course offerings, grouping, acceleration, and guidance services. In the final analysis, the study does suggest that size of school must be based upon local factors and costs.

As this study was being made, a publication by George Peabody College, School Size and Program Quality in Southern High Schools, by Jackson (31), was released wherein a report on secondary school size for various secondary organizations throughout the southern states was studied. While Jackson's study was not directly concerned with costs, his findings indicated a preferred minimum range for three-year high schools as being 700-950. He also indicated that program opportunity for students in three-year senior high schools increases for schools on to the size of 2000.

In the National Association of Secondary School Principals publication, Education for Work (42), one of the articles concerns administration of vocational education. The author states the following with regard to school size and vocational education:

> The move to larger school size means that generally these schools can provide more programs and services for themselves, that is, each school can be more comprehensive. Smaller schools will probably more often need to call on intermediate units-area vocational schools for example. (52:96)

This is presently a pattern of organization for some of the less densely populated counties in the State of Florida. The author continues:

> . . . For instance the question arises: What is the minimum size high school needed to offer an adequate vocational education program? Two hundred students in the vocational education program is a rule of thumb number commonly estimated as a rock bottom minimum by vocational educators though many factors alter this number in practice. This number, 200, assumes a minimum of five programs, 20 students per class and half day classes. With this base many variations are possible. If the 200 students are half of those in grades eleven and twelve, the school should have a minimum of eight hundred students in grades nine through twelve.

In summary the earlier studies generally indicated that the minimum size of the three-year senior high school should not be less than 300. More recent studies suggested that the minimum size be more nearly 800 to 900. The research available on optimum size is so limited it is impossible to draw a conclusion concerning recommendation on this matter.

CHAPTER III

THE DEVELOPMENT OF THE INSTRUMENTS OF MEASURES USED IN THIS STUDY

Instruments of measurement used in this study were essentially those developed by Woodham (54). However, there were some modifications with respect to calculating units of educational opportunity and instructional costs (Appendix C).

Many factors influence the decision of determining school size. Even though many of these factors are difficult, if not impossible to measure, this study considered certain factors which are important and which do lend themselves to some quantitative measures.

A major problem in education is how to maximize educational opportunity and minimize cost. Part of the failure to maximize educational opportunity stems from the fact that the cost of providing such a program under many existing school organizations is prohibitive. Certainly this is the view of the tax-paying public. Establishing small schools to satisfy community pride and dual school systems according to race has made operational costs excessive for many schools. These small schools are inefficient. Until greater efficiency has been reached, it is highly unlikely that such schools will receive the support needed to meet the stated goal.

Units for measuring educational opportunity are developed in the following sections of this chapter. These units can be used as partial indices for efficiency in educational organization.

Units of Educational Opportunity

A unit of educational opportunity as applied to subject offering was calculated as one unit for each different subject offered in the program of study for one academic year. Each subject offered and reported to the accreditation section of the State Department of Education had a code number assigned to that subject. The number of different sections of the same subject offering did not constitute quantity of educational opportunity. Each different subject offered for a period of 180 days, or one school term, was counted as one unit. An offering for one semester was counted as one-half unit. There were no exceptions in attaching the same importance to all offerings. Physical education, if offered at each grade level for three consecutive years, was represented as three units of educational opportunity. Subjects which were offered for more than one period a day, such as one and one-half periods, two periods, or three periods, as is common in some vocational offerings, was counted as one and one-half, two, or three units of educational opportunity. A typical program of study for a three-year junior high school and a three-year senior high school showing units of educational opportunity is included in Appendix A.

Each type of professional educational service was counted as five units, if employed full time. If the person was employed less than full time, the appropriate fraction of that time spent in such service was counted. It was assumed that each teacher taught five periods and may have taught five different units of educational opportunity during a six-period day. One period was usually set aside for planning. Professional

educational service personnel included principals, assistant principals, deans, counselors, or librarians for either full or part time at a particular school. When certain professional educational service personnel offered duplicate service, which was often the case for counselors and library services, only five units were counted.

Instruments of Cost Analysis

Costs included salaries for professional educational service personnel, teachers' salaries, and cost of transporting students. This represented 80 percent or more of current operating costs. Other current operating costs varied somewhat according to school size. These costs were difficult to determine and comprised a minor percentage of current operating costs. Actually, they had little or no bearing on relative costs per unit of educational opportunity. The cost for transporting students may significantly effect total costs. School systems desiring to establish larger size schools necessarily must consider transportation costs in a given school. The cost per student was determined by dividing the total school enrollment into the total allocated schools cost. The cost per unit of educational opportunity was determined by dividing the per-student cost by the total units (or quantity) of educational opportunity in a given school.

Formulas Used in the Study

M = Membership or student enrollment

Q = Quantity of educational opportunity = Total different subjects + total of the different types professional educational services

C^1 = Costs = Costs of salaries paid professional educational personnel + cost of teachers' salaries

$C^2 = C^1$ + transportation cost

C_p = Cost per student = Costs ÷ school enrollment or $C_p = \frac{C}{M}$

C_u = Cost per amount of opportunity = Cost per student ÷ quantity of educational opportunity or $C_u = \frac{C_p}{q}$

R_{st} = Ratio of student-teacher load = Enrollment ÷ number of teachers

R_{ss} = Ratio of students to professional educational service personnel = Enrollment ÷ number of professional educational service personnel

R_{ts} = Ratio of teachers to professional educational service personnel = Teachers ÷ number of professional educational service personnel

CHAPTER IV

THE RELATIONSHIP BETWEEN THE SIZE OF SCHOOLS AND THE QUANTITY OF OPPORTUNITY

The relationship between size and educational opportunity, or quantity of offerings, as determined by the curriculum and services offered in three-year junior high schools and three-year senior high schools will be analyzed in this chapter.

Size of the Three-Year Junior High Schools

The State Department of Education reported 177 three-year public junior high schools in Florida for the 1965-66 school year. Approximately 56 percent of the students in grades seven, eight, and nine attended three-year junior high schools in 1965-66.

Twenty-seven of the 67 counties, or administrative units, reported having one or more three-year junior high schools. The majority of the counties reporting were counties with large urban and suburban centers of population. For example, the six most populous counties reported 105 of the 177 three-year junior high schools. Rural or sparcely populated counties had other types of school organization.

The three-year junior high schools ranged in student enrollment from 213 to 1997. The average enrollment (size) of the three-year junior high school was 1076.

The average size teaching staff was 50 teachers and an average of 5.6 for non-teaching professional educational service personnel. Typically the staff of the three-year junior high school was: a principal,

a dean of girls, a dean of boys, a librarian, one full-time counselor, and one part-time counselor. Table 4 shows a distribution of three-year junior high schools according to size.

Three-year junior high schools with an enrollment of less than 500 students represented 3.47 percent of the total number of schools. The population of these schools comprised 1.12 percent of the total number of three-year junior high school students. Thirty-nine percent of the total number of three-year junior high schools and approximately 27 percent of the total enrollment of the three-year junior high schools had less than 1000 students enrolled. Three-year junior high schools which had more than 1000 students enrolled comprised 61 percent of the total number and 73 percent of the total enrollment. About 25 percent of these three-year junior high schools ranged in size from 1000 to 1199 and accounted for approximately 25 percent of the total enrollment. Three-year junior high schools with an enrollment of more than 1500 accounted for 9.7 percent of the total number of three-year junior high schools and approximately 19 percent of the total number of three-year junior high school students.

Size of the Three-Year Senior High Schools

Ninety-six three-year senior high schools were reported by the State Department of Education for Florida in the school year 1965-66. Of these 96 schools, five were classified primarily as vocational or technical schools and were excluded in the analysis of the data. Generally, these vocational-technical schools were specialized to serve large school districts and were not relevant in a study on size or membership of a

TABLE 4

DISTRIBUTION OF THREE-YEAR JUNIOR HIGH SCHOOLS ACCORDING TO SIZE

Size or Membership of Schools	Number of Schools	Percent of Schools	Student Population	Percent of Students
200-299	2	1.1	473	.25
300-399	1	.6	372	.20
400-499	3	1.7	1,405	.74
500-599	8	4.5	4,457	2.34
600-699	14	7.9	9,126	4.78
700-799	14	7.9	10,269	5.37
800-899	16	9.0	13,793	7.23
900-999	12	6.8	11,228	5.89
1000-1099	25	14.1	26,106	13.71
1100-1199	20	11.3	23,061	12.11
1200-1299	13	7.3	16,198	8.51
1300-1399	15	8.5	20,420	10.72
1400-1499	17	9.6	24,604	12.91
1500-1599	3	1.7	4,620	2.42
1600-1699	7	4.0	11,383	5.97
1700-1799	3	1.7	5,343	2.82
1800-1899	1	.6	1,838	.96
1900-1999	3	1.7	5,840	3.07
Totals	177	100.0	190,526	100.00

regular three-year high school. The remaining 91 schools had a total enrollment of 143,216 students. This represented approximately 60 percent of the total pupils enrolled in public schools in grades ten, eleven, and twelve during the 1965-1966 school year.

The three-year senior high schools were located in 26 of the 67 counties, or administrative units, whereas the three-year junior high schools were located in 27 of the 67 counties. Forty-six, or slightly more than 50 percent of these 91 schools, were located in the six most populated counties.

The schools ranged in size (enrollment) from 476 to 3401. The average size school was 1574. There was an average of 74.5 teachers and an average of 8.5 professional educational service personnel. Typically the structure of the staff was: a principal, an assistant principal, a dean of girls, a dean of boys, two librarians, and an average of 2.5 counselors. However, there were other staff organizations which included administrative assistants, department heads, assistant principals in curriculum, assistant principals in administration, assistant principals in guidance, and combinations of part-time librarian-teachers and counselor-teachers.

Table 5 shows the distribution of three-year senior high schools according to size. Intervals of 200 were used. Note that there were no three-year senior high schools with less than 400 students. Approximately 19 percent of the three-year senior high schools (17 schools) were less than 1000 in size. These schools enrolled 8.1 percent of the total number of students.

TABLE 5

DISTRIBUTION OF THREE-YEAR SENIOR HIGH SCHOOLS ACCORDING TO SIZE

Size or Membership of Schools	Number of Schools	Percent of Schools	Student Population	Percent of Students
400-599	6	6.6	4,303	3.1
600-799	4	4.4	2,685	1.9
800-999	5	5.5	4,580	3.2
1000-1199	11	12.1	12,041	8.4
1200-1399	10	10.9	12,644	8.8
1400-1599	13	14.3	19,860	13.9
1600-1799	4	5.5	10,346	7.2
1800-1999	11	12.1	20,976	14.6
2000-2199	12	13.2	24,837	17.4
2200-2399	2	2.2	4,470	3.1
2400-2599	1	1.1	2,335	1.8
2600-2799	3	3.3	7,844	5.5
2800-2999	0	0	0	0
3000-3199	3	3.3	9,473	6.6
3200-up	2	2.2	6,622	4.6
Totals	91	100.0	143,216	100.0

Approximately 37 percent of the three-year senior high schools (34 schools) enrolled more than 1000 students but less than 1600 students. These 34 schools enrolled slightly more than 37 percent of the total number of students.

Approximately 32 percent of the three-year senior high schools (29 schools) enrolled more than 1600 but less than 2200 students. The number of students enrolled in these schools comprised 39 percent of the total number of three-year senior high school students.

Ranging in size from 2200 to less than 2800 and enrolling slightly more than 10 percent of the total number of three-year senior high students were 6.6 percent of the three-year senior high schools (six schools). The five largest three-year senior high schools, which ranged from 3000 to 3401 students, comprised 5.5 percent of the three-year senior high schools and 11.2 percent of the total enrollment.

Quantity of Educational Opportunity

The amount of educational opportunity provided by the 177 three-year junior high schools and the 91 three-year senior high schools was found by summing the units of educational opportunity offered in each. These units were determined by course offerings and the amount of educational services rendered by the professional educational service personnel in each school.

As previously described in Chapter III, the units of educational opportunity were determined in the following manner.

1. Each different subject listed in the accreditation report and offered for a full academic year was counted as one unit of educational

opportunity. Physical education, although reported by schools as consisting of several different classifications, was counted as one unit if offered at each grade level. Therefore, the maximum number of units counted for physical education was three, one for each grade level. Additional units were not given for duplication or repetition of services. However, such duplication or repetition of services is offered because of enrollment.

2. Duplicate subject offerings or multiple offerings of the same subject were counted as one unit of educational opportunity.

3. A course offered for one semester was counted as .5 of a unit.

4. For each course consisting of more than one class period daily for an academic year, one unit of opportunity was given for each class period. Two class period subjects were counted as two units. Three class period subjects were counted as three units. These were primarily pre-vocational or vocational courses.

5. Non-teaching professional educational services offered at a school were counted as five units for each type of full-time service and a fractional part of five units when offered for less than full time. Additional units were not given for duplication or repetition of services. However, such duplication or repetition was often necessary because of enrollment.

Quantity of Educational Opportunity in the Three-Year Junior High School

The quantity of educational opportunity in three-year junior high schools ranged from a low of 23 units to a high of 109 units (see Table

6 and Figure I). The average number of units of educational opportunity offered in the 177 schools was 74.1 units; the median was 72.1 units. Recalling that the average three-year junior high school size was 1076 students, there was an average of 74.1 units of educational opportunity for this size school. These 74.1 units were comprised of 51 units in curriculum offerings and 23.1 units in services.

Ranges and averages, however, do not reveal all of the facts. Examination of individual schools revealed that there was a great variation in the quantity of educational opportunity in schools approximately the same size. Often more educational opportunity was available in smaller schools than in larger ones, as shown in Figure I.

Upon examination of the data presented in Table 6, the average number of units of educational opportunity increased as the enrollment or size of schools increased. Schools under 400 were quite limited in units of educational opportunity, while schools of 400 to 800 indicated a sharp rise in units of educational opportunity. Less noticeable was the increase of educational opportunity in schools with from 800 to 1200 students; also, schools with 1600 to 1999 students showed a slight gain over schools with from 1200 to 1600 students.

Quantity of Educational Opportunity in the Three-Year Senior High School

The quantity of educational opportunity in three-year senior high schools ranged from a low of 67 units to a high of 244.5 units. The average number of units of educational opportunity in the 91 schools was 131.5 units. The median was 127.7 units (see Table 7 and Figure II).

TABLE 6

AVERAGE NUMBER OF UNITS OF OPPORTUNITY IN THREE-YEAR JUNIOR HIGH SCHOOLS ACCORDING TO SIZE IN INTERVALS OF 100 MEMBERSHIP

Size	Number of Schools	Average Number of Units of Opportunity	Cumulative Increases or Decreases in Opportunity Units
200-299	2	36.5	--
300-399	1	31.0	-5.5
400-499	3	57.7	21.2
500-599	8	62.3	26.8
600-699	14	69.0	33.5
700-799	14	64.7	28.5
800-899	16	74.1	38.6
900-999	12	70.7	34.2
1000-1099	25	72.8	36.3
1100-1199	20	79.2	42.7
1200-1299	13	79.7	43.2
1300-1399	13	79.7	43.2
1400-1499	17	83.3	46.8
1500-1599	3	75.7	39.2
1600-1699	7	82.9	46.4
1700-1799	3	77.3	41.8
1800-1899	1	88.5	52.0
1900-1999	3	84.5	48.0

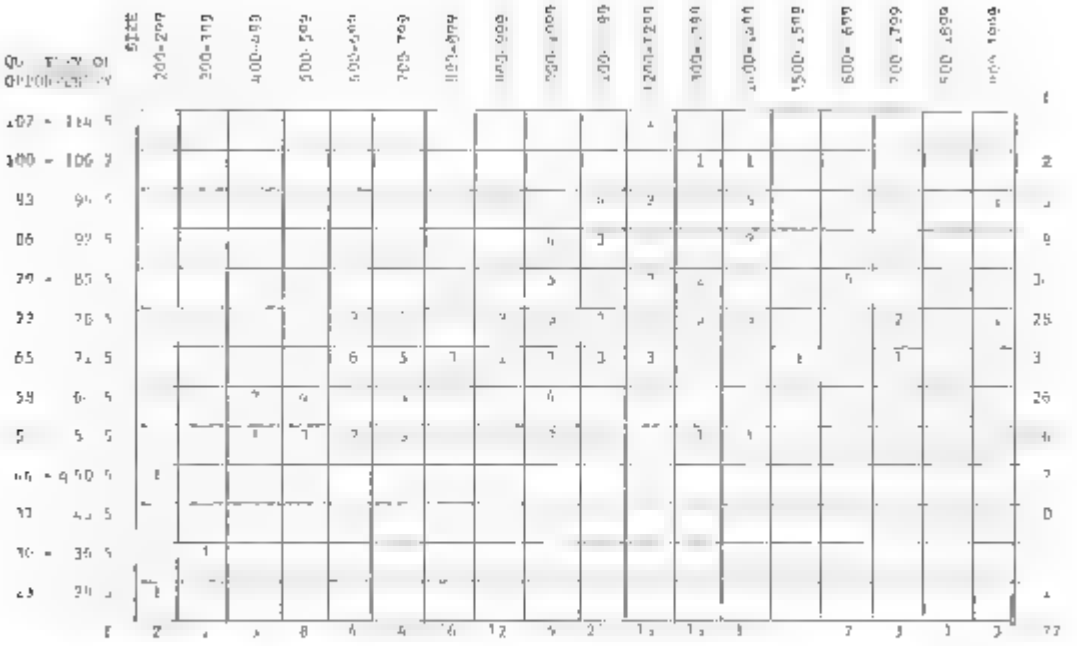

TABLE 7

AVERAGE NUMBER OF UNITS OF OPPORTUNITY IN THREE-YEAR SENIOR HIGH SCHOOLS ACCORDING TO SIZE IN INTERVALS OF 200 MEMBERSHIP

Size	Number of Schools	Average Number of Units of Opportunity	Cumulative Increases or Decreases in Units of Opportunity
400-499	8	80.7	--
600-799	4	96.5	15.8
800-999	5	99.5	18.8
1000-1199	11	115.9	35.2
1200-1399	10	132.0	51.3
1400-1599	13	124.2	43.5
1600-1799	5	147.0	66.3
1800-1999	11	142.5	61.8
2000-2199	12	144.4	63.7
2200-2399	2	151.5	70.8
2400-2599	1	228.0	147.3
2600-2799	3	177.0	96.3
2800-2999	0	0	0
3000-3199	3	181.5	100.8
3200 - up	2	221.5	140.8

400-599
600-799
800-999
1000-1199
1200-1399
1400-1599
1600-1799
1800-1999
2000-2199
2400-2599
2600-2799
2800-2999
3000-3199
3200 and up

Recall that the average size senior high school had 1574 students. This average size school had 131.5 units of educational opportunity. Of these units, 100.1 were based upon the curriculum and 31.4 upon professional educational services rendered to students.

Similar to the three-year junior high schools, the three-year senior high schools varied widely in quantity of educational opportunity in schools which were of approximately the same size. Some small schools offered more units of educational opportunity than certain larger ones. This is shown in Figure II.

An examination of the data in Table 7 reveals a rather clear indication that units of educational opportunity increased noticeably as enrollment increased. However, consideration must be given to the fact that these figures represented average units of educational opportunity and also that there were many variations within each interval. It is important to note that there were no three-year senior high schools with less than 400 students. Three-year senior high schools with less than 600 enrollment had 35.2 fewer units of educational opportunity than three-year senior high schools with from 1000 to 1199 students. Three-year senior high schools with from 1200 to 1799 students had 32 more units of educational opportunity than three-year senior high schools with from 1000 to 1199 students.

Three-year senior high schools with from 1800 to 2399 enrollment had an average of only 15.4 more units of educational opportunity than three-year senior high schools with from 1200 to 1799. This indicated a type of plateau apparently had been reached for schools with enroll-

ments from 1200 to 2400, although the units of educational opportunity continued to increase with size. The amount of such increases was not as much as might be expected. Three-year senior high schools size 2400 and larger had an average of 63.3 more units of educational opportunity than three-year senior high schools with enrollments of 1799 to 2399.

It appeared that three-year high schools under 1000 in membership or size did not offer the quantity of educational opportunity desired for a sufficiently broad curriculum and needed educational services. It also appeared that schools of 1600 or larger would be more desirable from the standpoint of quantity of educational opportunity than schools of less than 1600, although schools of 2400 or more did offer still greater quantity of educational opportunity to students.

Ratio of Students to Teachers, Students to Professional Educational Service Personnel, and Teachers to Professional Educational Service Personnel

An analysis of the various ratios did not reveal sufficient information to assist in determining a "best" size school. Tables 8 and 9 show the various ratios.

The Three-Year Junior High School

The junior high schools, within the 100 interval, ranged from 16.8 to 24.3 in pupil-teacher ratios with an average of 21.5. The student-professional educational service personnel ratios ranged from 117 to 263 with an average of 191.8. The teacher-professional educational service personnel ratios ranged from 5.5 to 11.9 with an average of 8.9. In schools of 800 in size the data indicated that there was a smaller ratio

TABLE 8

STUDENT-TEACHER, STUDENT-PROFESSIONAL EDUCATIONAL SERVICE PERSONNEL, AND TEACHER-PROFESSIONAL EDUCATIONAL SERVICE PERSONNEL RATIOS FOR THREE-YEAR JUNIOR HIGH SCHOOLS

Size	Number of Schools	Student-Teacher Ratio	Student-Professional Service Personnel Ratio	Teacher-Professional Service Personnel Ratio
200-299	2	21.3	118.3	5.5
300-399	1	23.5	206.5	8.9
400-499	3	16.8	117.0	7.0
500-599	8	19.6	131.6	6.7
600-699	14	21.3	171.8	8.1
700-799	14	21.5	162.7	7.5
800-899	16	21.8	179.5	8.3
900-999	12	22.0	180.0	8.2
1000-1099	25	22.9	197.0	8.6
1100-1199	20	22.6	189.0	8.4
1200-1299	13	22.6	173.0	7.7
1300-1399	15	23.0	206.0	8.9
1400-1499	17	22.8	212.0	9.3
1500-1599	3	22.7	216.0	8.9
1600-1699	7	24.3	243.0	10.9
1700-1799	1	23.5	232.0	9.9
1800-1899	3	23.6	263.0	11.1
Average		21.5	191.8	8.9

TABLE 9

STUDENT-TEACHER, STUDENT-PROFESSIONAL EDUCATIONAL SERVICE PERSONNEL, AND TEACHER-PROFESSIONAL EDUCATIONAL SERVICE PERSONNEL RATIOS FOR THREE-YEAR SENIOR HIGH SCHOOLS

Size	Number of Schools	Student-Teacher Ratio	Student-Professional Service Personnel Ratio	Teacher-Professional Service Personnel Ratio
400-599	8	17.8	138	7.7
600-799	4	18.9	156	8.3
800-999	5	21.0	199	9.5
1000-1199	11	20.0	154	7.7
1200-1399	10	20.4	176	8.6
1400-1599	13	21.4	191	8.9
1600-1799	6	20.3	193	9.5
1800-1999	11	21.5	199	9.3
2000-2199	12	21.9	207	9.5
2300-2399	2	23.0	215	9.3
2400-2599	1	20.0	211	10.5
2600-2799	3	22.0	174	7.9
2800-2999	0	0	0	0
3000-3199	3	22.4	201	8.9
3200 - up	2	22.0	177	8.1
Average		21.4	185	8 75

of students to teachers and staff. There seemed to be little difference in these ratios for schools ranging in size from 800 to 1300. Schools from 1300 upward tended to have the larger ratios.

It was difficult to assume that the slightly lower ratios meant more in quantity, quality, or a less utilization of staff. Also, it was difficult to assume that the higher ratios meant less quantity, quality, or a better utilization of staff. It did appear that such ratios resulted, to some degree, in lower costs per student according to school size. It was interesting to note that pupil-teacher average load was as low as 21.5 and that on the average there was one additional professional educational service person for each eight to nine teachers.

The Three-Year Senior High School

Table 9 shows that student-teacher ratios ranged from 17.8 to 23, when averages were considered with respect to membership intervals of 200, with an average of 21.4. Student-professional educational service personnel ratios ranged from 138 to 215 with an average of 185. Teacher-professional educational service personnel ratios ranged from 7.7 to 10.5 with an average of 8.75.

The three-year senior high schools tended to follow a pattern similar to the three-year junior high school. Three-year senior high schools below 1000 tended to have smaller ratios. Three-year senior high schools from 1000 to 2000 in size had the next higher ratios, with those above 2000 appearing to have had the highest ratios. Again, it was difficult to translate these data into anything significant as to advantage for "best" school size. How quantity or quality was affected is unknown.

It did appear that costs per student were affected by these ratios.

In an attempt to determine the correlation between school size and quantity of educational opportunity, the data were first correlated for 177 three-year junior high schools ($r = .52$). This represented a significant relationship which at first consideration would suggest that the larger the three-year junior high schools, the greater the quantity of educational opportunity.

TABLE 10

CORRELATIONS OBTAINED BETWEEN THE SIZE AND QUANTITY OF EDUCATIONAL OPPORTUNITY FOR THREE-YEAR JUNIOR HIGH SCHOOLS

Size	Number of Schools	Correlation
200-799	42	.49
800-1299	86	.23
1300-1999	49	.05
200-1099	93	.48
1100-1999	82	.10
200-1999	177	.52

This correlation did not indicate, however, at what point in size a correlation may vary. As can be seen in Table 10, there was a correlation of .49 in three-year junior high schools 200-799. The correlation of .23 for three-year junior high schools from 800-1299 was con-

siderably less. From three-year junior high schools 1300-1999, the correlation was only .05. Likewise, when the correlation for three-year junior high schools from 200-1099 was calculated, the correlation was .48. From three-year junior high schools 1100-1999 the correlation was less at .10. These correlations seemed to indicate that after a three-year junior high school reaches a size from 1099-1299 the relation between size and quantity of educational opportunity for larger schools tended to be less and less substantial. There was, however, a slight continuation of more quantity of educational opportunity as schools became larger--beyond the size of 1300.

TABLE 11

CORRELATIONS OBTAINED BETWEEN THE SIZE AND QUANTITY OF EDUCATIONAL OPPORTUNITY FOR THREE-YEAR SENIOR HIGH SCHOOLS

Size	Number of Schools	Correlation
400-1399	38	.68
1400-2199	42	.33
2200-3400	11	.49
400-1599	51	.61
1600-3400	40	.62
400-3400	91	.78

While the study of three-year junior high schools was not necessarily concerned with minimum sizes, it suggested that the desirable minimum appeared to be 800, and the three-year junior high school of 1300 appeared to be a desirable optimum size when only quantity of educational opportunity was considered. Three-year junior high schools larger than 1300 did not seem to offer enough additional opportunity to justify being larger for the purpose of increasing the quantity of educational opportunity.

The correlation between size and quantity of educational opportunity for the 91 three-year senior high schools in the study was .78 (Table 11). This was a substantial correlation indicating that as school size increased the quantity of educational opportunity increased. When schools ranging in size from 400 to 1399 were considered, the correlation of .68 appeared quite substantial. The three-year senior high schools from 1400 to 2199 had the least correlation ($r = .33$) while those from 2200 to 3400+ had a correlation of .49. In figuring correlation of three-year senior high school sizes from 400 to 1599 and from 1600 to 3400+, they were .51 and .62 respectively.

Quite unlike the three-year junior high schools, the correlation remains significant when sizes were varied, regardless of the variation. (Of course three-year junior high schools cannot and should not be compared.) The lowest correlation appears from size 1300 to 2199. This tended to suggest that quantity of educational opportunity did not seem to change greatly in rate as three-year senior high schools increased enrollment from 1400 to 2199. The next lower correlation appeared in

three-year senior high schools from 2200 to 3400 in size at .49. While it is difficult to conclude any suggested size as being a point at which the quantity of educational opportunity becomes less a factor according to size, it did appear that three-year senior high schools would need to be 1200-1300 in size as a desired minimum. The desired maximum did not actually appear in the data when only quantity of educational opportunity was considered.

Summary

The purpose of this chapter was to examine size of three-year junior high schools and three-year senior high schools and the relationship which existed between these sizes and the quantity of educational opportunity for students enrolled in those schools.

The Three-Year Junior High Schools

For the 177 three-year junior high schools in the study, the size ranged from 213 to 1997 with an average of 1076. These three-year junior high schools were reported from 27 of the 67 counties. The quantity of educational opportunity ranged from a low of 23 units to a high of 109 units. The average number of units of educational opportunity was 74.1. Figure I revealed that there was a great variation of units of educational opportunity in schools with like membership. The correlation between size and quantity of educational opportunity of the 177 three-year junior high schools was .52. However, when the 177 three-year junior high schools were separated into halves and thirds, approximately, according to the ranges in size, correlation for three-year junior high

schools of 1300 in size or better was .05. This seemed to indicate that after a three-year junior high school becomes larger than 1300, very little advantage in increased quantity of educational opportunity occurred.

When student-teacher, student-professional educational service personnel, and teacher-professional educational service personnel for the three-year junior high schools were studied, the larger size three-year junior high schools tended to show larger ratios in all three areas. There was no apparent significance in this which affected the study.

The Three-Year Senior High School

The 91 three-year senior high schools in the study ranged in size from 476 to 3401. The average size was 1574. The three-year senior high schools were located in 26 of the 67 counties. The quantity of educational opportunity ranged from a low of 67 units to a high of 244.5 units. The average was 131.5 units.

Figure II shows that there was a large variation in quantity of educational opportunity in three-year senior high schools of similar sizes. The correlation between size and quantity of educational opportunity was .78.

For three-year senior high schools ranging in size from 400-1299, the correlation was .69. For three-year senior high schools in size ranging from 1300-2199 the correlation was .28 and for three-year senior high schools ranging in size from 2200 to 3400+ the correlation was .49. The correlations for three-year senior high schools ranging in size from 400 to 1599 and from 1600 to 3400+ was .61 and .62 respectively.

When only quantity of educational opportunity was considered, there did not appear to be a desirable optimum size. A desirable minimum size, however, appeared to be in the neighborhood of 1000. The ratios of student-teachers, student-professional educational service personnel, and teacher-professional educational service personnel showed only that the ratios tended to increase as size increased.

CHAPTER V

THE RELATIONSHIP BETWEEN THE SIZE AND COST PER STUDENT FOR INSTRUCTION AND TRANSPORTATION IN THREE-YEAR JUNIOR HIGH SCHOOLS AND THREE-YEAR SENIOR HIGH SCHOOLS

There is general belief among educators that cost per student is a rather good indication both of greater opportunities and quality of education for students. While this may be true when considering large and efficient administrative units, it is not always true when comparisons are made school by school.

Instructional costs for each school was determined as follows: class room teachers' salaries were based on the average teacher salary for those teachers in all public schools in Florida during the school year 1965-66. Principals' and other administrative personnel salaries were based upon the average salary paid to all principals and administrative personnel according to the size of the public school in Florida during the school year 1965-66.

According to the Division of Finance in the Florida State Department of Education, estimated costs for transportation averaged approximately $35.00 per student in 1965-1966. In this study cost was applied uniformly to all transported students reported by the school to ascertain if transportation was a factor in determining school size.

The Three-Year Junior High School

The cost per student for instruction in three-year junior high schools ranged from $249.00 to $504.00 in 1965-1966. The average cost per student for instruction in the 177 schools included in the study was

$318.00 (see Table 12 and Figure III).

The cost per student for instruction and transportation ranged from $259.00 to $517.00. The average cost per student for instruction and transportation was $331.00 (see Table 12 and Figure IV).

Table 12, which was based upon average costs for three-year junior high schools in intervals of 100 membership, indicates the variation in costs for various size schools. The variation of costs within each interval is reflected in Figures III and IV. While there was considerable variation within and between intervals, there was a tendency for costs per student for both instruction and transportation to decline as schools became larger. This decline in cost can be partially explained by the increased student-teacher loads as reported in Chapter IV and by the fact that larger schools tended to be located in areas of dense population where the percentage of students transported may have been less.

It is quite noticeable, however, that three-year junior high schools below 600 reflected the highest cost per student for instruction and transportation. The schools with an enrollment of less than 800 students tended to cost more per student than schools with more than 800 enrolled. If per-student cost was the only consideration for instruction or transportation, or both, the indication here would suggest that 600 would be the minimum size school and that a preferred minimum would be 800 students. The optimum size was not indicated by the data, however, the cost reduction was so gradual after an enrollment of 1000 that one might question the desirability of having three-year junior high schools larger than this if only those costs are the major concern.

TABLE 12

AVERAGE COST PER STUDENT FOR INSTRUCTION AND INSTRUCTION PLUS TRANSPORTATION IN THREE-YEAR JUNIOR HIGH SCHOOLS

Size	Number of Schools	Average Cost Per Student for Instruction	Average Cost Per Student for Instruction and Transportation
200-299	2	340	353
300-399	1	373	390
400-499	3	415	435
500-599	8	355	377
600-699	14	319	333
700-799	14	334	349
800-899	16	325	338
900-999	12	315	331
1000-1099	25	307	325
1100-1199	20	322	335
1200-1299	13	310	320
1300-1399	15	303	311
1400-1499	17	306	317
1500-1599	3	306	314
1600-1699	7	289	300
1700-1799	3	311	318
1800-1899	1	294	299
1900-1999	3	291	314

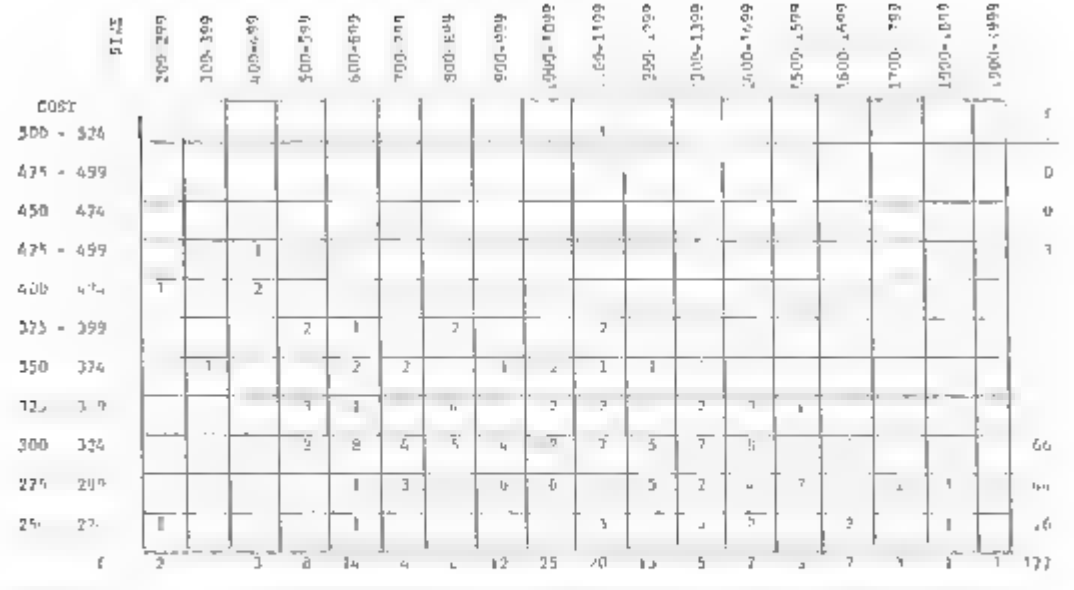

Figure III The Relationship Between Square Foot Cost Per Student and Square Footage for Elementary and Middle Schools

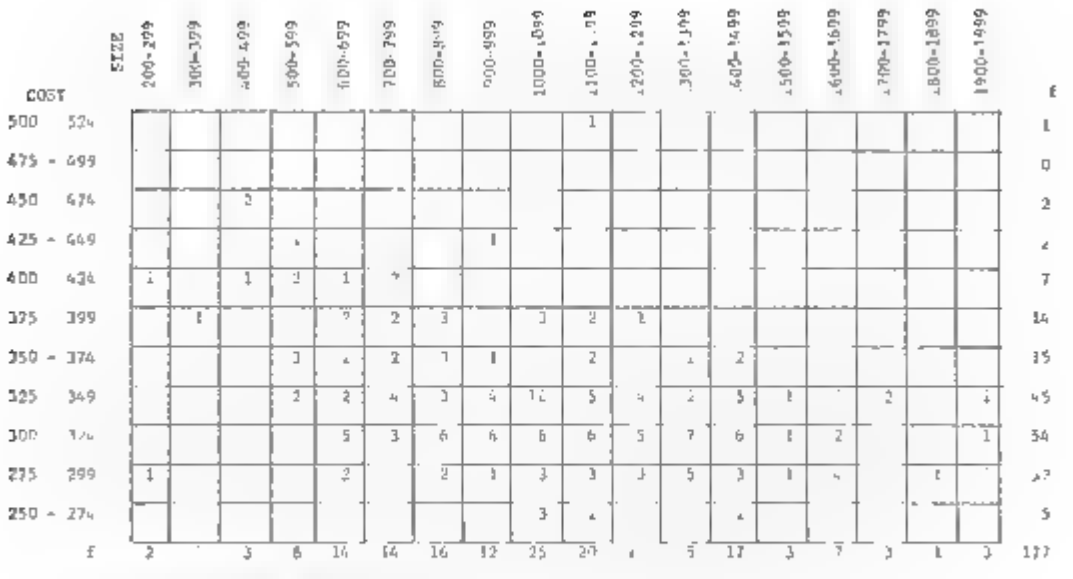

Figure I The Relationship Between Size and Cost Per Student for Instruction and Transportation in Three-Year Junior High Schools

The correlations between size and cost per student were negative--as size increased cost per student tended to decrease. These correlations were not significantly high, however. Tables 13 and 14 indicate that the highest correlation (-.43) for instruction and for instruction plus transportation seemed to occur in three-year junior high schools ranging in size from 200 to 1099. The lowest correlation in both tables corresponded to three-year junior high schools ranging in size from 800 to 1299 (-.05 and -.07) and 1300 to 1999 (-.14 and -.04). Schools ranging in size from 1100 to 1999 had a correlation of 0.22 for instruction and -.19 for instruction and transportation. The correlation for the entire 177 three-year junior high schools was -.38 for instruction and -.41 for instruction plus transportation.

The data indicated that when only cost per student was the concern, larger three-year junior high schools tended to cost less per student. The cost per student, however, after 800 was not greatly significant. When transportation costs plus instructional costs were compared to instruction costs only, the correlation was slightly higher. The three-year junior high school with a size in excess of 1100 tended to have a lower correlation for instruction and transportation costs than for instructional costs alone. For the total number of schools concerned, transportation did not seem to be a significant factor in the determination of school size for three-year junior high schools.

The Three-Year Senior High School

The cost per student for instruction ranged from a low of $238.00 to a high of $618.00 in the three-year senior high schools studied. The

TABLE 13

CORRELATIONS BETWEEN SIZE AND COST PER STUDENT FOR INSTRUCTION IN THREE-YEAR JUNIOR HIGH SCHOOLS

Size	Number of Schools	Correlation
200-799	42	-.32
800-1299	86	-.05
1300-1999	49	-.14
200-1099	95	-.43
1100-1999	49	-.22
200-1999	177	-.38

TABLE 14

CORRELATIONS BETWEEN SIZE AND COST PER STUDENT FOR INSTRUCTION AND TRANSPORTATION IN THREE-YEAR JUNIOR HIGH SCHOOLS

Size	Number of Schools	Correlation
200-799	42	-.33
800-1299	86	-.07
1300-1999	49	-.04
200-1099	95	-.43
1100-1999	82	-.19
200-1999	177	-.41

average cost per student for instruction in these 91 schools was $344.00 (see Table 15 and Figure V).

The cost per student for instruction and transportation combined ranged from a low of $295.00 to $630.00. The average cost per student for the 91 schools was $355.00 for instruction plus transportation (see Table 15 and Figure VI).

Table 15, which was based upon average costs for schools in intervals of 200 membership, indicates the variation in costs for three-year senior high schools of different sizes. This variation is more significantly reflected in Figures III and IV. The data revealed that per-student costs for instruction and for instruction plus transportation tended to decrease as the size of the three-year senior high schools increased.

It was interesting to note that the highest costs per student for instruction occurred in the smallest twelve three-year senior high schools which were under 800 in size. With one exception, the average cost per student for instruction plus transportation was highest in three-year senior high schools under 1800 in size. This can probably be explained by the fact that more teachers were employed to provide an adequate curriculum and by the fact that these schools tended to be located in communities with a less dense population requiring more students to be transported.

Correlations in Table 16 indicate that there was a negative relationship between size and cost per student for instruction, which is to say that when three-year senior high school size increased, cost per

TABLE 15

AVERAGE COST PER STUDENT FOR INSTRUCTION AND INSTRUCTION PLUS TRANSPORTATION IN THREE-YEAR SENIOR HIGH SCHOOLS

Size	Number of Schools	Average Cost Per Student for Instruction	Average Cost Per Student for Instruction and Transportation
400-599	8	400	425
600-799	4	371	396
800-999	5	320	349
1000-1199	11	385	399
1200-1399	10	341	361
1400-1599	13	322	341
1600-1799	6	338	351
1800-1999	11	327	336
2000-2199	12	321	329
2200-2399	12	303	309
2400-2599	1	360	374
2600-2799	3	325	338
2800-2999	0	*	*
3000-3199	3	302	311
3200-3401	2	300	306

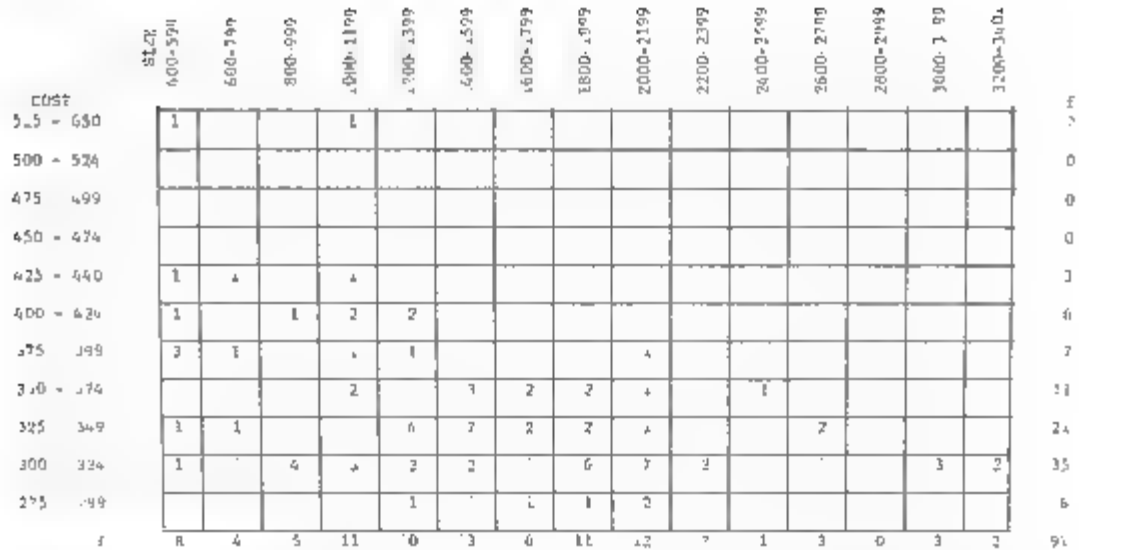

Figure 9 The Relationship Between Size and Cost Per Student for Instruction in Three-Year Senior High Schools

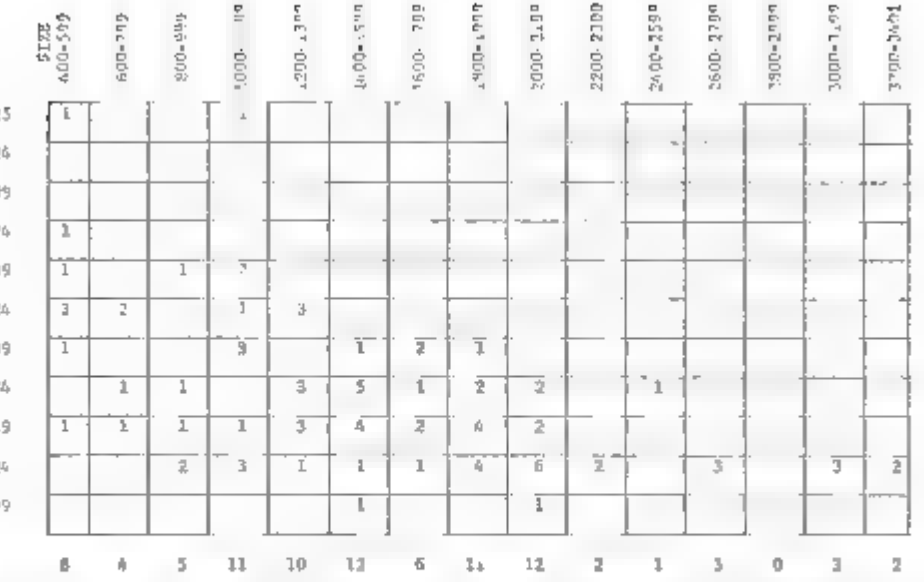

Figure VI The Relationship Between Size and Cost Per Student of Elementary Buildings Built in Three Year Sample Periods

student for instruction decreased. The correlation for all 91 three-year senior high schools ranging from 400 to 3401 was -.44. The 91 three-year senior high schools were divided into certain ranges in size to ascertain if there would be a better correlation between size and cost per student for instruction. Each correlation of the ranges shown was found to be less than the correlation of the total group.

There appeared to be little difference when cost for instruction plus transportation per student or cost for instruction per student alone was correlated with size. These correlations appear in Table 17. The correlation between cost per student for instruction and transportation for all 91 three-year senior high schools was 0.49, indicating that, as three-year senior high schools became larger, costs for instruction and transportation become less.

In the division of certain ranges of three-year senior high schools the correlations tend to be less than for the correlations of the total number of three-year high schools. In most cases the correlations between size and cost for transportation plus instruction were higher than for instructional costs alone. It would appear that if such correlations had significance, larger three-year senior high schools operated at less cost per student for both instruction and transportation than did smaller schools for instruction alone. Even though the correlations seemed high when transportation costs were added to costs for instruction on a per-student basis, it did not necessarily signify that larger schools should be built regardless of transportation cost.

The only conclusion based upon the available data concerning the 91

TABLE 16

CORRELATIONS BETWEEN SIZE AND COST PER STUDENT FOR INSTRUCTION IN THREE-YEAR SENIOR HIGH SCHOOLS

Size	Number of Schools	Correlation
400-1399	38	-.19
1400-2199	42	-.15
2200-3401	11	-.39
400-1599	51	-.34
1600-3401	40	-.30
400-3401	91	-.44

TABLE 17

CORRELATIONS BETWEEN SIZE AND COST PER STUDENT FOR INSTRUCTION AND TRANSPORTATION IN THREE-YEAR SENIOR HIGH SCHOOLS

Size	Number of Schools	Correlation
400-1399	38	-.44
1400-2199	42	-.27
2200-3401	11	-.39
400-1599	51	-.37
1600-3401	40	-.31
400-3401	91	-.49

three-year senior high schools was that the larger schools tended to operate more efficiently and economically when instructional costs were considered. Transportation costs did not appear to be a significant factor in determining school size within the densely populated urban areas included in this study.

Summary

Per-student costs did not appear to be the best indication for determining school size since there was no way of ascertaining what these costs provided in the way of programs. Nevertheless, there was evidence that per-student costs for instruction and for instruction plus transportation tended to decrease as size increases.

The Three-Year Junior High School

Cost per student for instruction and cost per student for transportation tended to decrease as the three-year junior high school increased in size. The average cost per student was greatest for three-year junior high schools with an enrollment of less than 1000 students. This average per-student cost increased even more for those schools with less than 600 students. There appeared to be very little difference in cost per student for three-year junior high schools with an enrollment greater than 1300 students.

The correlation between size and cost per student for instruction and instruction plus transportation was negative. The most significant correlation appeared in schools under 1000. The larger schools showed a relatively low correlation between size and cost per student for instruction and for instruction plus transportation.

The Three-Year Senior High School

Cost per student for instruction tended to decrease as the size of the three-year high school increased. Transportation costs per student also decreased with the increase of school size. Three-year senior high schools with enrollment less than 800 students seemed to have the highest per-student cost. Three-year senior high schools with enrollment less than 1800 students tended to have the highest cost per student than larger schools when cost for instruction plus transportation were considered. Although the number of three-year senior high schools from 2200 to 3401 students was limited, these schools appeared to operate more economically than those with smaller enrollment.

There was a negative correlation for cost per student for instruction and three-year high school size. As these schools became larger, the cost per student decreased. The correlations for selected intervals of the total range were not substantially high, nor was there a substantial correlation for the total number of the schools in the study. The highest correlation was -.44. The only conclusion one could make is that larger schools tended to cost less per student for instruction than smaller schools.

The correlation between size and per-student cost for instruction plus transportation was 0.49, only slightly more than the correlation when instructional cost per student alone was considered. When cost per student for instruction plus transportation was considered, larger size three-year senior high schools tended to cost less per student than do smaller three-year senior high schools. One might then conclude that,

as far as the 91 three-year senior high schools studied were concerned, cost for transportation was not a significant factor in determining school size. It must be remembered, however, that larger size three-year senior high schools tended to appear in densely populated areas where the number of and distance for transported students was less than three-year senior high schools located in sparsely settled administrative units.

CHAPTER VI

THE RELATIONSHIP BETWEEN SIZE AND COST PER STUDENT PER UNIT OF EDUCATIONAL OPPORTUNITY FOR INSTRUCTION AND TRANSPORTATION IN THREE-YEAR JUNIOR HIGH SCHOOLS AND THREE-YEAR SENIOR HIGH SCHOOLS

The purpose of this chapter is to study the cost per unit of educational opportunity and its relationship to school size. This technique was developed by Woodham (54) in a previous study. The advantage to this method is that it compares costs according to programs in schools of various sizes. The formula for this determination is $C_u = \frac{C_p}{q}$, where C_p is the cost per student, q is the quantity of educational opportunity, and C_u is the cost per student per unit of educational opportunity.

Size and Cost Per Student Per Unit of Educational Opportunity in Three-Year Junior High Schools

The cost per student per unit of educational opportunity for instruction in the 177 three-year junior high schools ranged from $2.94 to $12.00. The average cost was $4.44 (see Table 18 and Figure VII).

When both instruction plus transportation costs were considered per student per unit of educational opportunity, the range was from $3.14 to $12.00. The average cost was $4.63 (see Table 18 and Figure VIII).

Figure VII indicates a wide variation in cost per student per unit of educational opportunity for three-year junior high schools. Figure VIII indicates the variation in cost per student per unit of educational opportunity for instruction and instruction plus transportation. Table 18 shows the average cost per student per unit of educational opportunity for three-year junior high schools within each interval and the average

TABLE XI

AVERAGE COST PER STUDENT PER UNIT OF EDUCATIONAL OPPORTUNITY FOR INSTRUCTION AND INSTRUCTION PLUS TRANSPORTATION IN THREE-YEAR JUNIOR HIGH SCHOOLS

Size	Number of Schools	Instruction	Transportation
200-299	2	$9.50	$10.00
300-399	1	12.00	12.00
400-499	3	7.17	7.50
500-599	8	5.54	5.98
600-699	14	4.61	4.84
700-799	14	5.21	5.44
800-899	16	4.46	4.63
900-999	12	4.59	4.82
1000-1099	25	4.29	4.52
1100-1199	20	4.12	4.27
1200-1299	13	3.98	4.13
1300-1399	15	3.85	3.96
1400-1499	17	3.76	3.92
1500-1599	3	4.05	4.13
1600-1699	7	3.50	3.62
1700-1799	3	3.99	4.13
1800-1899	1	3.32	3.37
1900-1999	3	3.48	3.77

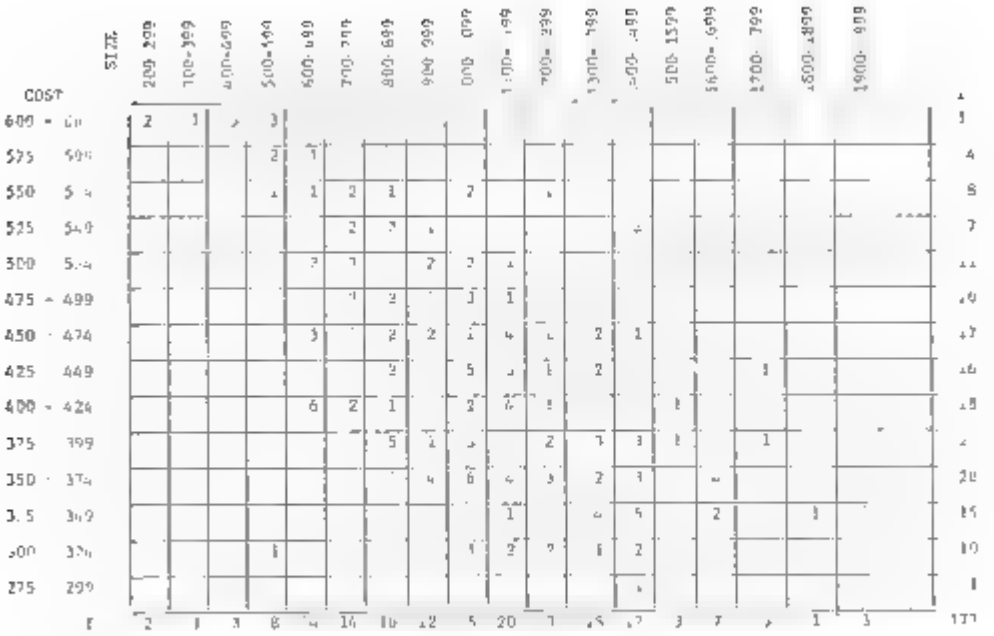

Figure 917 The Relationship of Size and Cost for Two Year Junior High Schools

COST		SIZE																		
		200-299	300-399	400-499	500-599	600-699	700-799	800-899	900-999	1000-1099	1100-1199	1200-1299	1300-1399	1400-1499	1500-1599	1600-1699	1700-1799	1800-1899	1900-1999	f
625	Up	2	1	3	2		3		1											11
600	624				4	1		1		1										5
575	599				1	2		2		2	1	1		1						8
550	574						5		1	1				2						9
525	549					1	2		1	3	1						1	1		7
500	524					1	4		1	2			1						1	11
475	499					1		3	1	3			1	1						12
450	474					1		3	1	3	5						1		1	14
425	449					6	2	3		1	3	1	2		2				1	22
400	424				1	1		1	1	2	2	3	3	3			1			15
375	399							3	1	6	2	1	1	4	1					24
350	374									2	3	2	1	4		3	1			19
325	349										2	3	1	4		3		1		16
300 -	324													1					1	4
	f	2		3	8	6	6	16	12	25	20	3	15	17	3	7	3	1	3	177

Figure 7.7 The Relationship Between Size and Cost Per Student Per Mile of Existing and Optimum Capacity for Intercity Transportation in Three-Year Junior High Schools

costs in each interval for instruction and instruction plus transportation. An analysis of this table revealed that three-year junior high schools below 600 appear to have the highest per student per unit of educational opportunity cost. The junior high schools with less than 1000 students had a higher cost per student per unit of educational opportunity than those schools with more than 1000 students. The analysis also showed that as the three-year junior high schools became larger, costs per student per unit of educational opportunity became smaller. While there was no indication of a "preferred" size, there may well have been some question as to what might have been gained after a three-year junior high school became larger than 1300 when considering transportation and instruction as factors in per student per unit of educational opportunity cost.

Tables 19 and 20 show a negative correlation between size and cost per student per unit of educational opportunity. As the three-year junior high school size became larger, the cost per student per unit of educational opportunity tended to decrease. When instructional costs were considered, and when instruction plus transportation costs were considered, the correlations were quite similar, indicating that transportation costs did not seem to be a factor in determining three-year junior high school size.

The overall correlation for all 177 three-year junior high schools for instruction was .61 and for instruction plus transportation was .63. When certain ranges in school size were considered, the highest occurred in three-year junior high schools between 200 to 799 in size, which was

TABLE 19

CORRELATIONS BETWEEN SIZE AND COST PER STUDENT PER UNIT OF EDUCATIONAL OPPORTUNITY FOR INSTRUCTION IN THREE-YEAR JUNIOR HIGH SCHOOLS

Size	Number of Schools	Correlation
200-799	42	-.74
800-1299	86	-.27
1300-1999	49	-.13
200-1099	95	-.63
1100-1999	82	-.27
200-1999	177	-.61

TABLE 20

CORRELATIONS BETWEEN SIZE AND COST PER STUDENT PER UNIT OF EDUCATIONAL OPPORTUNITY FOR INSTRUCTION PLUS TRANSPORTATION IN THREE-YEAR JUNIOR HIGH SCHOOLS

Size	Number of Schools	Correlation
200-799	42	-.76
800-1299	86	-.28
1300-1999	49	-.09
200-1099	95	-.65
1100-1999	82	-.24
200-1999	177	-.63

.74 for instruction and .76 for instruction plus transportation. For schools between 800 and 1299 in size these correlations were .27 for instruction and .28 for instruction plus transportation. The lowest correlation appeared for three-year junior high schools from 1300 to 1999 in enrollment with .13 for instructional cost and .09 for instructional cost plus transportation cost. For schools ranging in size from 200 to 1099, the correlations were .63 for instructional cost and .65 for instructional cost plus transportation costs. For schools ranging in size from 1100 to 1999, the correlation dropped to .27 for instructional costs and .24 for instructional cost plus transportation cost.

While an analysis of the data did not necessarily suggest an optimum size for three-year junior high schools, there were indications that such schools below 800 in enrollment offered less at a greater cost and such schools below 600 still less at even a greater cost. Hence, 600 represented a minimum, with 800 a preferred minimum. Three-year junior high schools from 800 to 1299 show a less substantial correlation and might be considered as a preferred range in this school size. For schools ranging in size from 1300 to 1999, the correlation was so small that there was little indication that three-year junior high schools larger than 1300 could offer any advantage for per student costs per unit of educational opportunity.

Size and Cost Per Student Per Unit of Educational Opportunity in Three-Year Senior High Schools

For the 91 three-year senior high schools in the study with sizes ranging from 476 to 3401, the range for costs per student per unit of

educational opportunity ranged from a low of $1.20 to a high of $7.36 when only instructional costs are considered (see Table 21 and Figure IX). The average cost for instruction per student per unit of educational opportunity was $2.76. With transportation costs added to instructional costs, the per student per unit of educational opportunity average cost was $2.87 (see Table 18 and Figure X).

Table 21, which lists the average costs per student per unit of educational opportunity for three-year senior high schools in intervals of 200 student membership, gives a clear indication that these per student per unit of educational opportunity costs decreased as the size of the school increased. In terms of dollars, it was noticeable that the three-year senior high schools under 800 had average costs of better than $4.00 per student per unit of educational opportunity. Schools with less than 1200 membership had an average cost of more than $3.00 per student per unit of educational opportunity. Schools with less than 2400 had an average cost in excess of $2.00, while schools from 2400 to 3401 in size had a per student per unit of educational opportunity average cost of less than $2.00.

Figures IX and X show a wide variation in costs per student per unit of educational opportunity for three-year senior high schools of similar size. These variations indicated that educational opportunity could be broadened at a reasonable cost if attempts were made to offer a variety of subjects and services in three-year senior high schools of all sizes. Schools of less than 800 were the most limited in educational offerings and the least economical. Three-year senior high schools of

TABLE 21

AVERAGE COST PER STUDENT PER UNIT OF EDUCATIONAL OPPORTUNITY FOR INSTRUCTION AND INSTRUCTION PLUS TRANSPORTATION IN THREE-YEAR SENIOR HIGH SCHOOLS

Size	Number of Schools	Instruction	Transportation
400-599	9	$5.11	$5.35
600-799	4	4.00	4.17
800-999	5	3.40	3.60
1000-1199	11	3.31	3.50
1200-1399	10	2.67	2.78
1400-1599	13	2.68	2.81
1600-1799	6	2.32	2.42
1800-1999	11	2.33	2.41
2000-2199	12	2.28	2.36
2200-2399	2	2.00	2.03
2400-2599	1	1.51	1.64
2600-2799	3	1.83	1.90
2800-2999	0	-	-
3000-3199	3	1.63	1.87
3200-3401	2	1.35	1.36

The Relationship Between Size and Per Student Per Square Foot Cost for Instruction in Three-Year Senior High Schools

Figure X The Relationship Between School Size and Cost Per Student Per Year of Education Opportunity for Instruction and Transportation for Rural Four Year Secondary Schools

800 membership might well be considered as the minimum, with 1000 as the desired minimum size.

Table 22 shows a high negative relationship, -.76, when per student per unit of educational opportunity cost for instruction is compared to school size. This emphasizes the fact that cost per student per unit of educational opportunity decreases as the size of schools increases.

From Table 21 it is evident that the cost per student per unit of educational opportunity does not greatly decline after a school reaches an enrollment from 2400-2599. Even though there were not enough schools larger in size than 2400 in the study to indicate a valid optimum size school, the optimum size school may well be considered as being in the range of 2400 to 2600.

It is noted however that the correlation between cost per student per unit of educational opportunity varied to a large degree at different points in the distribution. Rather strangely the correlation was only 0.38 for schools ranging in size from 1400 to 2199, but -.78 for schools ranging from 2200 to 3400+ in size.

Similar results are shown in Table 23 when cost per student per unit of educational opportunity for instruction plus transportation were considered. The correlation for the 91 three-year senior high schools was -.77, as compared to -.76 when only instructional costs were considered. It was slightly higher negatively for high schools with 400 to 1399 (-.75), and for schools sized from 1400 to 2199 (-.41). However, for high schools of 2200 to 3401 it was a less substantial negative correlation, -.56, compared to -.73 when instructional costs alone are

TABLE 22

CORRELATIONS BETWEEN SIZE AND COST PER STUDENT PER UNIT OF EDUCATIONAL OPPORTUNITY FOR INSTRUCTION IN THREE-YEAR SENIOR HIGH SCHOOLS

Size	Number of Schools	Correlation
400-1399	38	-.72
1400-2199	42	-.38
2200-3401	11	-.73
400-1599	51	-.73
1600-3401	40	-.62
400-3401	91	-.76

TABLE 23

CORRELATIONS BETWEEN SIZE AND COST PER STUDENT PER UNIT OF EDUCATIONAL OPPORTUNITY FOR INSTRUCTION PLUS TRANSPORTATION IN THREE-YEAR SENIOR HIGH SCHOOLS

Size	Number of Schools	Correlation
400-1399	38	-.75
1400-2199	42	-.41
2200-3401	11	-.56
400-1599	51	-.75
1600-3401	40	-.57
400-3401	91	-.77

considered. It would be difficult to assess exactly what this cost correlation figure means. It could give the indication that after schools reach 2199 in size in Florida, to transport additional students might reach the point of saturation. That is, it might be a disadvantage to make a three-year senior high school larger than 2200 if it was necessary to make a substantial increase in the number of students transported.

However, if it is possible to increase the size of a three-year senior high school beyond 2200 without greatly increasing the number of transported students, evidence in Table 22 indicates that cost per student per unit of educational opportunity could still be further reduced by so doing.

It appeared that for the 91 high schools in the study, transportation does not seem to be a major factor in determining the cost per student per unit of educational opportunity. It becomes evident that if it is feasible to transport students on the basis of time and distance, it would be desirable for school systems to do so in order to provide a greater amount of educational opportunity more economically.

Summary

The cost per student per unit of educational opportunity has the advantage of measuring a school program in terms of size and costs.

The Three-Year Junior High School

The average cost per student per unit of educational opportunity for instruction was $4.44, and for instruction plus transportation it was $4.63. There was a large range in cost per student per unit of edu-

cational opportunity for schools of similar size as well as different sizes. The schools of similar size ranged in costs from $2.94 to $12.00. The greater costs per student per unit of educational opportunity and the highest correlations between these same costs indicated that the junior high schools below 600 enrollment offered much less at a greater cost per student for educational opportunity. While the analysis did not clearly reveal a preferred maximum size, there was substantial evidence that the cost per student per unit of educational opportunity did not decrease in three-year junior high schools over 1300 in size sufficiently to support advocating any larger school than this.

The Three-Year Senior High School

The cost per student per unit of educational opportunity varied considerably for three-year senior high schools of similar sizes. As such schools became larger these costs declined and continued to decline up to the largest size school which had an enrollment of 3401. These costs for instruction and instruction plus transportation ranged from $1.20 to $7.36. The average cost per student per unit of educational opportunity for instruction was $2.76, and for instruction plus transportation, it was $2.87. Average costs indicate that three-year senior high schools under 600 have the highest cost per student per unit of educational opportunity which is in excess of $5.00. Three-year senior high schools under 800 in size had an average cost of more than $4.00 and schools under 1200 in size, an average cost of more than $3.00 per student per unit of educational opportunity. Three-year senior high schools under 2400 in size averaged more than $2.00 in cost per student

per unit of educational opportunity. Schools larger than 2400 in size had an average cost per student per unit of educational opportunity of less than $2.00.

There was a negative correlation between size and cost per student per unit of educational opportunity. These negative correlations tended to support the average costs per student per unit of educational opportunity with -.76 and -.77 for all 91 schools. When certain ranges within the total number were sub-divided, the highest correlations occurred in three-year senior high schools ranging in size from 400 to 1399. A lower correlation existed for those schools with 1400 to 2199 students. The correlation for schools 2200 to 3400+ is about the same as for schools 400-1399. There seemed to be no evidence that transportation is a major factor in the determination of school size except to slightly favor larger three-year senior high schools up to size 2200. The data suggested that schools below 800 are less efficient than the others and should perhaps be the absolute minimum. It would appear, however, that a three-year senior high school of 1000 would be a preferable minimum. While there appears to be no maximum or optimum school, the advantages of three-year senior high schools larger than 2400-2600 in size tend to diminish to the extent that unless there is a high density of population there would be some question as to whether schools of this type organization should become any larger than 2600 in size.

CHAPTER VII

SUMMARY AND CONCLUSIONS

The basic purpose of the study was to investigate:

1. The relationship between school size and quantity of educa-

2. The relationship between school size and cost per student for instruction and transportation

3. The relationship between school size and cost per student per

Specifically the purpose of the study was to determine, if possible, the most desirable minimum and optimum sizes for three-year junior and three-year senior high schools. The criteria used to make this determination were the quantity of educational opportunity provided, the cost per student for instruction and transportation, and the cost per student per unit of educational opportunity.

The study involved schools organized solely on the three-year junior high school (grades seven, eight, and nine) and three-year senior high school (grades ten, eleven, and twelve). It was further confined to existing public schools located in the State of Florida for the 1965-1966 school year.

Initially, the study involved gathering data relative to:

1. Course offerings
2. Professional educational services rendered, other than teaching
3. The cost for instruction
4. The cost for transportation

The Florida State Department of Education and the Florida Educational Association were the primary sources of the data.

The costs included the average annual salary for all teachers, the average annual salary for all the administrative personnal according to type and to size, and the average annual cost per transported student in the state of Florida for the school year 1965-66.

The quantity of educational opportunity included the number of different subjects offered according to time allocated and the number of different professional educational services rendered other than classroom teaching and the allocated time of such services. Costs and quantity of educational opportunity was determined for each school in the study according to organization and size. Per student costs were determined by dividing the costs for a given school by the student membership of that school. Per student per unit of educational opportunity cost was determined by dividing the per student costs by the quantity of educational opportunity offered in a given school.

The Three-Year Junior High School

The 177 three-year junior high schools existed in 27 of the 67 counties. These schools were located mostly in densely populated areas. The range in school sizes was from 213 to 1997 with an average size of 1076. The units of educational opportunity ranged from 23 to 109 units with an average quantity of 74.1. A higher correlation (.49) between school size and quantity of educational opportunity occurred in schools ranging in size from 200 to 799. The lowest correlation (.05) between size and quantity of educational opportunity occurred for schools ranging

in size from 1300 to 1999. The correlation between size and quantity of educational opportunity for all 177 three-year junior high schools was .52. This indicates that as schools become larger, the quantity of educational opportunity increased.

As three-year junior high schools became larger, the ratios for student-teacher, student-professional educational service personnel, and teacher-professional educational service personnel became higher. This indicated a more efficient utilization of staff and a more economical operation.

Cost per student for instruction and transportation decreased as the size of schools became larger. The average cost per student is highest for those three-year junior high schools with less than 800 students. There appeared to be little difference in cost per student for schools larger than 1300 in size. The correlation between school size and cost per student for instruction and transportation was negative. This indicated that cost per student decreased as school size increased. The highest negative correlation (-.33) occurred for schools of less than 800. The least negative correlation (-.04) occurred for schools larger than 1300.

The cost per student per unit of educational opportunity decreased as the size of the three-year junior high school increased. Schools with membership of less than 800 had the highest average cost and the highest negative correlation (-.76). Schools larger than 1300 in size had the lowest average cost and the lowest negative correlation (-.09).

The Three-Year Senior High Schools

The 91 three-year senior high schools in the study ranged in size from 476 to 3401. The average size was 1574. These schools existed in 26 of the 67 counties, mostly in areas of dense population. The quantity of educational opportunity ranged from 267 to 344.5 units. The average was 131.5 units. There was a large variation of educational opportunity in schools of similar size. However as schools increased in size the average quantity of educational opportunity increased. The correlation between size of three-year senior high schools and quantity of educational opportunity for the 91 schools was .78. The higher correlations occurred for schools ranging in size from 400-1399 and from 2200-3400 with .68 and .49, respectively. The lower correlation (.33) occurred for schools ranging from 1400 to 2199.

The ratios for student-teacher, student-professional educational personnel, and teacher-professional educational personnel became higher as the size of the three-year senior high school increased.

The cost per student for instruction and transportation tended to decrease as the size of the three-year senior high schools increased. The highest average per student cost for instruction and transportation occurred for school sizes of 900 or less. The lowest per student costs for instruction and transportation occurred in schools 2200 and larger in size. The correlation between size of three-year senior high schools and per student cost for instruction and transportation for all 91 schools was -.49. The lower negative correlation (-.24) occurred for schools ranging in size from 400-1399 and the higher negative correlation

(-.39) occurred for schools ranging from 2200 to 3401.

The cost per student per unit of educational opportunity varied for three-year senior high schools of similar sizes, however as the school size increased the cost per student per unit of educational opportunity decreased. The highest average cost per student per unit of educational opportunity occurred in schools 800 or less in size. The lowest such cost occurred for schools 2400 or larger. The correlation between size of three-year senior high schools and the cost per student per unit of educational opportunity for all 91 schools was -.77. Schools ranging from 400 to 1399 and from 2200 to 3400+ had the higher negative correlation with -.75 and -.57 respectively. The lower negative correlation (-.41) occurred for schools ranging from 1400 to 2199.

Conclusions

Since this study was undertaken primarily to determine what size schools offer the greatest amount of educational opportunity at the most economical unit cost for both three-year junior high schools and three-year senior high schools, conclusions for these different schools will be made separately.

The Three-Year Junior High School

The following conclusions are made from the analysis of the data.

1. The quantity of educational opportunity varies greatly in schools of similar size. This indicates that there are factors other than size which limit, especially in curriculum, the quantity of educational opportunity. Factors such as the nature of the community served,

the facilities, equipment, materials available, the philosophy of the school, and the school and faculty qualifications influence quantity of educational opportunity.

2. In most cases, despite variation, as school size increases the quantity of educational opportunity increases.

3. The most noticeable limitation in quantity of educational opportunity occurs for schools below 400 in student enrollment, while the least gain in quantity of educational opportunity appears after a school reaches 1300 in student enrollment.

4. Student-teacher, student-professional educational service personnel, and teacher-educational service personnel ratios tend to increase as size increases. This appears to indicate a more efficient utilization of personnel.

5. As school size increases the cost per student for instruction plus transportation decreases.

The cost per student per unit of educational opportunity appears to be highest in schools below 600 in size. Cost per student per unit of educational opportunity declines little after a school reaches 1300 in [redacted].

Therefore, when cost per student per unit of educational opportunity is used as the principal determinant for minimum and optimum size of three-year junior high schools, it appears that ideally, three-year junior high schools should be a minimum size of 800 and an optimum size of 1300.

The Three-Year Senior High School

The following conclusions are made regarding three-year senior high schools.

1. The quantity of educational opportunity varies for schools of similar size. This indicates that there are factors other than size which limit the quantity of educational opportunity available for students. Factors such as the school plant, the community served, the philosophy, and administrative practices are likely to impose limitations on the quantity of educational opportunity.

2. The quantity of educational opportunity usually increases as the size of the school increases. This increase is more rapid in the senior high school than in the junior high school. This may be due to an expanded opportunity for subject electives and fewer required subjects in the senior high school.

3. When the enrollment is below 800 the school experiences the greatest limitation in quantity of educational opportunity. Schools even larger than 2200 have a greater quantity of educational opportunity.

4. As schools become larger, the ratios of student-teacher, student-professional educational service personnel, and teacher-professional educational service personnel become higher. This appears to indicate a more efficient utilization of personnel.

5. Although cost per student varies for schools of similar size and for schools of different sizes, the cost per student tends to decrease both for instruction and for transportation as school size increases. The highest costs are found in schools with an enrollment less than 800. The

lowest costs per student per unit of educational opportunity are found in schools with an enrollment of 2400 or more.

Therefore in terms of cost per student per unit of educational opportunity, the minimum size for a three-year senior high school should be 800 to 1000 in enrollment. An analysis of the data in the study did not indicate the optimum size for a three-year senior high school. The analysis did indicate, however, that three-year senior high schools with an enrollment of 2400 can provide more opportunity than schools smaller in size. A recommended optimum range in three-year senior high school size would be from 2400 to 2600.

TABLE 24

THE 177 THREE-YEAR PUBLIC JUNIOR HIGH SCHOOLS IN FLORIDA

Range	Average			Correlation
In Size	Size	Number of Teachers	Ed. Service Personnel	
237-1997	1076	50	5.6	For Educational Opportunity and Size .52
In Quantity of Educational Opportunity	Quantity of Educational Opportunity	In Curriculum	In Service	
23-109	74.1	51	23.1	
Range in Cost Per Student	Average Cost Per Student			Correlation for Size and Cost Per Student
Instruction Only $259-$504	$318			-.38
Instruction and Transportation $259-$518	$331			-.41
Per Unit of Educational Opportunity for Instruction Only $2.94 - $12.00	$4.44			-.61
Per Unit of Educational Opportunity for Instruction and Transportation $3.14 - $12.00	$4.63			-.63

TABLE 25

THE 91 THREE-YEAR HIGH SCHOOLS IN FLORIDA

Range	Average			Correlation
In Size	Size	Number of Teachers	Ed. Service Personnel	
476-3401	1574	74.5	8.5	
In Quantity of Educational Opportunity	Quantity of Educational Opportunity	In Curriculum	In Service	
67-244.5	131.5	100.1	31.4	.78
Range in Cost Per Student	Average Cost Per Student			Correlation for Size and Cost Per Student
Instruction Only $283-$618	$344			-.44
Instruction and Transportation $295-$630	$355			-.49
Per Unit of Educational Opportunity For Instruction Only $1.20-$7.36	$2.76			-.61
Per Unit of Educational Opportunity for Instruction and Transportation $1.22-$7.36	$2.87			-.63

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APPENDICES

APPENDIX A

A SAMPLE PROGRAM OF STUDIES FOR A THREE-YEAR JUNIOR HIGH SCHOOL WITH COURSE CODE, COURSE TITLE, AND UNIT(S) OF OPPORTUNITY

Course Code	Course Title	Units of Opportunity
101	ENG B7	1
102	ENG B8	1
103	ENG B1	1
111	ENG 7	1
112	ENG 8	1
113	ENG 1	1
121	ENG A7	1
122	ENG A8	1
123	ENG A1	1
130	READ RM 7	1
132	READ RM 8	1
135	READ 8	1
140	READ 7	1
146	READ A7	1
189	ENG IMP	1
213	MATH G1	1
216	GRAM FL	1
231	MATH MDR7	1
232	MATH MDR8	1
237	MATH R2	1
261	MATH MD 8	1
263	MATH MD 1	1
251	MATH MDA7	1
252	MATH MDA8	1
253	MATH MDA1	1
301	SCI B7	1
302	SCI B8	1
303	SCI GB	1
311	SCI 7	1
312	SCI 8	1
313	SCI G	1
321	SCI A7	1
322	SCI A8	1
323	SCI A1	1
410	GEO 7	1
412	HY 8	1
413	CIV 1	1
420	GEO A7	1
422	HY A8	1
423	CIV A	1
501	SPANISH 7	1

APPENDIX A

A SAMPLE PROGRAM OF STUDIES FOR A THREE-YEAR SENIOR HIGH SCHOOL WITH COURSE CODE, COURSE TITLE, AND UNIT(S) OF OPPORTUNITY

Course Code	Course Title	Units of Opportunity
106	ENG B4	1
114	ENG 2	1
115	ENG 3	1
116	ENG 4	1
164	JOURN 2	1
174	SPEECH 2	1
191	PBLCTN 1	1
192	PBLCTN 2	1
193	PBLCTN 3	1
204	MATH G B2	1
205	MATH G B3	1
206	MATH G B4	1
244	MATH MD 2	1
245	MATH MD 3	1
246	MATH MD 4	1
254	MATH MDA2	1
255	MATH MDA3	1
256	MATH MDA4	1
283	BUS MATH 1	1
304	BIO B1	1
313	BIO 2	1
354	SCI G A	1
373	BSCS	1
376	CHEMSTUDY	1
378	PSSC	1
414	W HY	1
416	A HY	1
425	SOC	1
474	CONTEM HY	1
503	SPANISH 1	1
504	SPANISH 2	1
505	SPANISH 3	1
506	SPANISH 4	1
513	LATIN 1	1
514	LATIN 2	1
523	FRENCH 1	1
524	FRENCH 2	1
525	FRENCH 3	1
526	FRENCH 4	1
564	PY ED 2	1
565	PY ED 3	1
566	PY ED 4	1
573	DR ED	1

Course Code	Course Title	Units of Opportunity
603	BAND 1	1
613	BAND	1
617	CHO G MF	1
627	CHO A MF	1
629	CHO A F	1
674	ART 2	1
675	ART 3	1
676	ART 4	1
703	TYP P	1
704	TYP 1	1
705	TYP 2	1
706	SHORTHD 1	1
707	SHORTHD 2	1
708	BKKP 1	1
713	BUS G 1	1
716	OFF P	1
723	DCT 1	3
724	DCT 2	3
753	HOME EC 2	1
754	CLOSTEX	1
756	FDAMTR	1
813	DRFT 1	1
814	DRFT 2	1
901	AIR CND	3
904	A MCH	3
911	ST BLDG	3
918	ADV ART	3
938	GAS EG	3
955	V MACH	3
975	V PRINT	3
978	RAD TV	3
983	REL TRADE 1	1
984	REL TRADE 2	1
985	S METAL	3
994	WELDING	3

78 Course Offerings

101 1/2 Units of Opportunity

APPENDIX B

Data Tabulation Sheet

1. School Palm Beach 2. Type High School (3 years)
3. Student membership 1511 4. Number of transported students 766
5. Number of teachers 72 6. Number of educational services personnel 10

Opportunity Analysis

7. Type of educational service personnel in terms of units of opportunity

		Half Time	Full Time	Total
A.	Principals		1	5
B.	Assistant Principals		1	5
C.	Deans		5	10
D.	Counsellors		4	5
E.	Librarians		2	5
F.	Others		0	0
			TOTAL	30

8. Number of subject area units of opportunity 100
9. Quantity (total units) of opportunity (7+8) 130
10. Per Student quantity of opportunity (9÷ 3) .09

Cost Analysis

11. Teacher cost (5 x estimated average salary) 511,200
12. Educational service personnel cost (6 x estimated average salary) 93,860
13. Transportation cost (4 x estimated average cost per student) 26,810
14. Total major current opp rtunity cost 631,870

15. Cost per student (14 ÷ 3) 418.2

16. Cost per unit of opportunity (15 ÷ 9) 3.22

Other Data

17. Ratio of membership to teachers (3 ÷ 5) 20.9 : 1

18. Ratio of membership to educational service personnel (3 ÷ 6) 151.1 : 1

19. Ratio of teachers to educational service personnel (5 ÷ 6) 7.2 : 1

Data Tabulation Sheet

1. School Comiston 2. Type Junior High School (3 years)
3. Student membership 1250 4. Number of transported students 422
5. Number of teachers 56 6. Number of educational services personnel 8

Opportunity Analysis

7. Type of educational service personnel in terms of units of opportunity

	Half Time	Full Time	Total
A. Principals		1	5
B. Assistant Principals		1	5
C. Deans		2	10
D. Counsellors		2	5
E. Librarians		2	5
F. Others		0	0
		TOTAL	30

8. Number of subject area units of opportunity 61
9. Quantity (total units) of opportunity (7 + 8) 91
10. Per Student Quantity of opportunity (9 ÷ 3) .07

Cost Analysis

11. Teacher cost (5 x estimated average salary) 397,600
12. Educational service personnel cost (6 x estimated average salary) 75088
13. Transportation cost (4 x estimated average cost per student) 14,770
14. Total major current opportunity cost 487,458

15. Cost per student (14 ÷ 3) 390

16. Cost per unit of opportunity (15 ÷ 9) 4.28

Other Data

17. Ratio of membership to teacher (3 ÷ 5) 22.3 : 1

18. Ratio of membership to educational service personnel (3 ÷ 6) 156:31 : 1

19. Ratio of teachers to educational service personnel (5 ÷ 6) 7 : 1

APPENDIX C

WOODHAM'S INSTRUMENTS OF MEASURE

A Unit of Educational Opportunity

A unit of educational opportunity is defined as a quantitative measure of the breadth of educational opportunity based upon subject offerings and special services provided. The unit of educational opportunity should not be confused with the Carnegie unit. It is not based upon the amount of credit allowed for any subject nor upon the number of units required for graduation.

In order to measure the breadth of educational opportunity provided in a school, it was necessary to convert subject offerings and special services into units of educational opportunity. In other words, it was necessary to convert subject offerings and special services into equivalent quantitative units. It is not a measure of a given unit. The following criteria were used for this purpose:

1. Each subject offered for a full term, except physical education, was valued as one opportunity unit. The number of sections of a course does not add to the breadth of the program and consequently has no effect upon the number of opportunity units allowed. Only one opportunity unit is allowed, regardless of whether there is one section or twenty sections.

2. A subject offered for one semester, except physical education, was valued at one-half an opportunity unit.

3. One unit was allowed for each subject included in a core curriculum. Where core programs were included in a curriculum, the core was equated to one or more subject units on the basis of the time devoted to

that part of the program.

4. Physical education was valued at one-half unit per year. Only a half-unit was allowed for each year of physical education since additional years are not equivalent to taking new subjects such as in the sci-

5. Each full-time special and administrative service was valued at five units of opportunity.

6. Each half-time special service was allowed two and a half units.

7. Special services rendered by an organizational unit larger than that of a school center, e.g., state, city, county, were not counted as units of educational opportunity for a school.

8. Units of opportunity were allowed for services only when a professionally trained staff member devoted half-time or full-time to each service. The services provided were equated to the units and not the number of persons required to provide the service. For example, one librarian may provide library services in a small school, whereas three librarians may be required to provide the same services in a larger school. Nevertheless, only five units would be credited to each school for library service.

The five units for special services were based upon the maximum number of units one person could add to the breadth of the school program through subject offerings. It is generally accepted that a maximum teaching load, in terms of class sections taught, is five periods per day. If a teacher has a different subject each period, she would add five units of educational opportunity to the school program. It was assumed that the full-time services of at least one person are required to offer one of the

special services; therefore, if a full-time teacher can contribute five units of opportunity, it seems reasonable to allow five units for a full-time special service.

Determining Per Pupil Cost

Instructional salaries at the local school level were selected as the basis for determining per pupil cost. In this study instructional salaries are interpreted to include the salaries of principals, librarians, guidance counselors, and other special instructional personnel. This does not include salaries of clerical help. Instructional salaries were selected as the basis for determining the cost per pupil for the following reasons:

1. They are more easily determined for each individual school than other types of expenditure. Items which would ordinarily be included in the current expenditures for a given school center are usually purchased by the central administrative office and it would be rather difficult to determine the total current expenditure for any one school. Many administrative units do not keep a record of the total current expenditure for each school center, but all keep records of the salaries paid instructional personnel for individual schools.

2. Instructional salaries comprise a major part of the total of current expenditures. The percentage of the total current expenditures allocated to teachers' salaries is fairly constant among schools.

BIOGRAPHICAL SKETCH

Charlie T. Council was born in Palmetto, Florida on December 19, 1923. He attended the public schools of Manatee County, Florida and entered the University of Florida in 1940. He served in the Army of the United States from 1943 to 1946, during which time he attended the University of Kentucky where he completed the basic course in engineering. Later he served overseas in the Pacific theater. He resumed his studies at the University of Florida in 1946, receiving a BAE degree with honors in 1948, a MAE degree in 1949, and the Rank I certificate in 1954. He has served as a coach, teacher, dean, assistant principal, principal, director of education, and is currently Assistant Superintendent in Instruction for Palm Beach County, Florida. He is married to the former Jane Edwards and is the father of a son, Tommy, and a daughter, Suzanne.

This dissertation was prepared under the direction of the chairman of the candidate's supervisory committee and has been approved by all members of that committee. It was submitted to the Dean of the College of Education and to the Graduate Council, and was approved as partial fulfillment of the requirements for the degree of Doctor of Education.

April 22, 1967

Dean, College of Education

Dean, Graduate School

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